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# AMERICAN VETERINARY REVIEW

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# AMERICAN VETERINARY REVIEW,

APRIL, 1889.

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## EDITORIAL.

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TO OUR READERS.—The REVIEW enters into its teens—our thanks to contributors—the journal is one of the necessities of the profession—good things said of her—editorial modesty overcome—the profession is worthy of our best efforts. UNITED STATES VETERINARY MEDICAL ASSOCIATION.—Relations between it and the Review—the last meeting in Boston—a good attendance—New York's neglect—revising the by-laws again—reports of committees—let all colleges publish the names of their graduates—papers read—tuberculosis—mediate contagion—recording clinical observations. SPELTER OR SPELTERINE.—A new remedy—it is only a preparation of zinc—our success in its use for chronic scratches. CERTAIN CURE FOR SPRING-HALT.—We may recommend the trial of some drugs but not all—booming quackery is not our work—if a new therapeutic is worthy, let it be known. PEDDLERS OF VETERINARY SCIENCE.—The credulity of people—especially in veterinary matters—the impostor in human medicine—now in veterinary—his general appearance—mode of acting—look out for him—the remedy—the duty of the veterinary societies—the moment his trade won't pay he will stop.

TO OUR READERS.—The addition of a digit to the figures which change our volume number from the twelfth to the thirteenth, and thus introduces the REVIEW into its teens, though far from tincturing our consciousness with any suggestion of a venerable feeling, still reminds us that it will be quite in order to address our readers with a word or two of acknowledgment for the pleasure of their good company hitherto, and the expression of a hope that we may in the time to come enjoy it in largely increased measure. To our contributors we tender a special word of acknowledgment, and to all of our friends in the profession we offer anew our assurance of our appreciative consideration for

their support and encouragement, in whatsoever form it may have reached us.

If the REVIEW has not by this time become established as one of the necessities of the profession, it has not been through any lack of effort on our part, and if we fail to improve its character and enlarge its usefulness in the new volumes yet to be issued, it will not be because our aim has become lower and our resources diminished. If, as some one writes, "Veterinarians cannot do without it; if when one number has miscarried, inquiries are at once made why it has not come; if our list of subscribers is increasing," if, in short, all that the editor hears from correspondents and friends in relation to the REVIEW is not greatly exaggerated, the editor may be pardoned if for once he has been overtempted, and his usual conspicuous modesty has succumbed to a sense of excusable pride in securing its present status for the REVIEW, upon its accomplishment of its entrance into its teens.

And meanwhile, we must not allow ourselves to forget that there are higher considerations and a more influential motive, aside from those which are merely personal, which should not be ignored, in the indulgence of a laudable ambition to contribute to the welfare of the veterinary profession at large by studying and laboring for the great interests and the enhancement of the growing influence of this important member of the great family of the sciences at large.

UNITED STATES VETERINARY MEDICAL ASSOCIATION.—Proudly remembering this honorable body as its legitimate progenitor, the REVIEW has been accustomed, at least once in six months, to make a formal tender of its respectful service and filial duty to "the author of its existence." This observance has usually been so timed as to correspond with the semi-annual meetings of the Association, and has also coincided with the commencement of a new volume of the REVIEW. We have no intention of intermitting this custom, having been "to the manner born," and we again hereby renew our obeisance, wishing, moreover, for many future opportunities for its repetition.

These occasions have, by a highly judicious arrangement, regularly "flitted," from year to year, in respect to the matter of

locality, and have circulated extensively, from community to community, and city to city; now favoring New York, then changing to Cincinnati; thence to Philadelphia; meeting again in Baltimore and now giving Boston a turn, where the last meeting was held, on the usual day and at the usual hour; but by some extraordinary change made at the very hour appointed for the meeting of the Comitia Minora. Our compliments are surely due for that, and also for the manner in which the entire affair was conducted.

It was a good meeting, with a fair representation, New York City, however, being conspicuous by her almost complete lack of representatives, four only being present. Amongst sundry items of business of a private character, promotive of the welfare of the Association, which were disposed of, was the adoption of a resolution for a complete revision of the Constitution, which may be accounted a strange proceeding.

The general meeting was interesting, and the reports of committees able and good. Some little feeling was elicited by the reading of that which came from the Committee on Intelligence and Education, but it was wisely strangled by a general vote of the meeting. If the deans of the faculties of the various Veterinary Colleges would take the trouble to make public, through the medical and veterinary press, the number of their graduates and their names and addresses, errors like that which gave rise to the difficulty caused by the report of the Chairman on Intelligence and Education might be avoided. The REVIEW would be pleased to publish them; indeed, such publication is, in fact, an obligation due from every institution to its graduates, for their protection against the impostors and charlatans whose misdoings bring discredit upon reputable and responsible practitioners.

A valuable paper on *Tuberculosis* was read by Dr. Winchester, which was followed by some discussion. There was also an answer to Dr. Salmon's views on the subject of mediate contagion, by Dr. Gadsden, which was read by the Secretary, and a paper on "Recording Clinical Observations," by Dr. A. Liautard, read by the author.

The meeting adjourned in order to destroy a splendid supper, in which duty they labored without abatement until railroad time

was announced, and those who were homeward bound were under the necessity of abandoning their task. The next meeting will convene in Brooklyn.

SPELTER OR SPELTERINE.—The general pharmacopœ in use by the veterinary practitioner of former times—and not very remote times either—was doubtless in its scope and completeness, quite adequate to the requirements imposed upon it by the contemporary condition and standards of the profession as it might then be measured.

But the world moves, and as was but natural, the development and growth of veterinary science, with its constant discoveries of new medical means and appliances, has superseded and abolished not a few of the panaceas and specifics which were once highly esteemed and widely trusted.

If practitioners in human medicine have taken advantage of the numerous discoveries which have in late years rewarded their activity in research and experiment, their veterinarian cousins have not been far in the rear in the march of progress, and in recent times, very few of the novelties which secure favor and adoption in the treatment of human maladies fail of speedy adoption and adaptation by those who occupy the related field of veterinary therapeutics.

As occasion required, we have frequently called the attention of our readers to such new drugs as have at intervals secured an introduction and establishment into medical practice, and in doing this we have been specially desirous, and have taken special pains to avoid everything in our remarks which might suggest a suspicion of a desire to “boom undeservedly” a new article; and while giving to our friends the results of our experience, and at the same time leaving to their decision the final verdict as to the value of the article which may be the subject of examination and trial, we intend to continue to observe the same rule.

Spelter, commercially known as spelterine, is a new curative agent which has been introduced into our markets, and is said to possess sundry excellent healing properties. This substance is sold in the form of a powder, and is a preparation of zinc in its purest condition, and as such, may be used as an excellent dressing for some kinds of suppurating wounds.

There is no doubt that the excellent astringent and antiseptic properties by which this powder is characterized render it a very beneficial application for the promotion of the healing process in large wounds. But in our hands, it has produced its most satisfactory results when it has been administered in the form of an ointment. In this shape, when used in the treatment of chronic scratches and obstinate erythematous eruptions, it has given us great satisfaction, and we think the preparation is well worth a faithful trial at the hands of our confreres.]

CERTAIN CURE FOR SPRING-HALT.—Our object in making occasional mention of new drugs and curative preparations must not be misinterpreted, and it must not in any case be inferred from our doing so that the REVIEW has it in contemplation to become the advocate and supporter of every or any pretentious nostrum. Invitations similar to the one which we recently received must, therefore, not expect a very kind reception at our hands, when from the very tone in which they are conveyed they betray the taint of charlatanism and imposture. The notice to which we refer was sent to us by persons signing themselves “veterinarians,” and offering us “a sure and certain cure for string or spring-halt in horses.” A *cure* is guaranteed; failure has never been seen—its *exact* location is now well known—the medicine is used both internally and externally, and success is assured in from one to two weeks, according to circumstances. The notice concludes by saying “we propose to give the profession the advantage of the discovery by furnishing the medicines and directions on *liberal terms*.” We have only this to say to such an offer: Gentlemen, if you propose to *give*, do so; but do not offer a “sell” as a favor. Let the profession try your remedy; you may feel assured that if it but half fulfills what is promised, we shall all be only too willing to give you such recognition and reward as your discovery deserves.

PEDDLERS OF VETERINARY SCIENCE.—The credulity of the public in exposing their willingness to listen to the proclamations of the claims of every kind of humbug which chooses to thrust itself into notice is almost proverbial, and of all the professions which are exploited in this way the medical, we sometimes think,

is the one which suffers the most. And as veterinary science progresses, its interests seem also doomed to suffer in the same manner.

The evil has indeed reached to such an extent that it seems to us that the time has come when it has become the duty of all regular practitioners to look carefully to their interests and those of their patrons and to guard them vigilantly against the dangers arising from the tricks and pretensions of a new class of quacks and impostors. The new enemy against whom the profession are called to make an earnest stand and to wage mortal combat, is the traveling veterinarian, sometimes styling himself a "veterinary student," and at others a "regular graduate," and perhaps covering himself with the disguise of an alumnus of some reputable veterinary college. This new plague, against which the veterinarian of education is doomed to fight, is ordinarily a man more or less familiar with animals, and who may in some cases seem to possess a little smattering of information, or if he has none he pretends it by the exhibition of an array of a few books, very often from obsolete and refuted authors; he is more or less fluent and "smart;" he *delivers lectures*; and as we are informed, as to one specimen, by one of our correspondents, "awakens a considerable interest in this branch."

Our friends must look out for these new peddlers of science, which commodity they sell at quite too high a price, however low their financial terms may seem to be.

The best, if not the only way in which their bad influence can be overcome is the careful scrutiny by the authorized and permanent veterinary societies, of all questionable claims, and the enforcement of the laws (where that is practicable), which we are glad to be able to say are in existence, as the fruit of a commendable intelligence existing in some few of the States of the Union, for the protection and regulation of veterinary medicine. That several States are now enjoying the benefits of these laws is a cause for congratulation, and we have a strong hope that in a time not remote, every commonwealth in the Union will be similarly privileged.

With ample protection like this, the veterinarian interest

need no longer fear aggression, either from without or within, and may condemn all the agents of quackery and deception, if not absolutely, at least to such an extent as to render their labors too unprofitable and dangerous to encourage them in the prosecution of their nefarious occupation.

## ORIGINAL ARTICLES.

### GENEALOGY OF THE HORSE, AND ITS IMPORTANCE TO THE HUMAN RACE.

A Paper read before the Deutscher Literarischer Club, Cincinnati, October 3rd, 1888, by J. C. Meyer, Sr.\*

GENTLEMEN:—The history of the horse is best known of all domestic animals, and is closely associated with that of man.

The horse and the ass have been the object of the most unremitting attention by man from the beginning of human civilization; that poets, philosophers, statesmen, historians, rural-economists, warriors, hunters, speculators, physiologists, and veterinarians have all objects where the horse at least, forms a conspicuous element; that from the inspired poetry of the Book of Job, from the times of Homer, Aristotle, Xenophon, Herodotus, Virgil, Varro, Columella, Gesner, Aldrovandus, Johnston, Buffon, Linnæus, Pennant, Pallas, Gmelin to Saint Hillaire, Cuvier, Bell and a host of others ancient and modern, facts and observations have been accumulating, researches pursued and descriptions produced, where we trace patient investigation and often eloquent description.

From the earliest period to the present time, the horse has been and still is the ruling factor in war, and at all times was the dearest object of the warrior, at whose hands it received the kindest treatment.

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\*LITERATURE.—The Horse, Hamilton Smith; Zahnung und Abstammung des Pferdes, Branski; Vortraege ueber Pferdekunde, Adam; Exterieur des Pferdes, Hoffman; Das Pferd, Loeffler.

The fate of nations is dependent upon the number and use of the equidæ. In all history it is apparent that those nations which were rich in horses were always superior to and conquered those who had few or no horses. For instances, the Hyksos conquered ancient Egypt with the aid of their horses. The Magyars invaded Germany, Italy and even France on their horses. The spread of the Mohammedan religion is due to a great extent to the horse. Also in the conquest of America the horse rendered the Spaniards efficient services. Thus it follows that more is known of the development of horse breeding than of any of the other domestic animals.

By comparing the relative conditions of extant animals and fragments of fossils, the history of the development of our domestic animals was made known piece-meal by different prominent naturalists, and finally an entire picture was presented. This is particularly true of the horse, whose ancestors, by clear and distinct progression, gradually attained the present stage of development.

Huxley is entitled to special credit for having (in his lectures delivered in America) presented the theory of development in such popular style as to be easily comprehended by the public, while Kowalewski, Rutimeyer, Marsh, Burmeister and others, wrote in a style intelligible only to paleontologists, or at least such who are well versed in anatomy and geology.

The family equidæ is commonly divided into three species; horse, ass and zebra. Of the four-footed vertebrates this group occupies the foremost rank.

The trunk of the horse rests on four limbs. The anterior limbs each comprise shoulder blade, arm, forearm, knee-joint, canon bone, two splint bones, pastern, coronary and coffin bones, two sesamoidal bones and a navicular bone; the posterior limbs consist of the thigh, leg, hock-joint, canon bone, two splint bones, pastern, coronary and coffin bones, two sesamoidal bones and a navicular bone. The extremity of the horse's foot is enclosed in a solid horny capsule.

If the fore foot of the horse be compared with the human hand, and the hind foot with the human foot, a certain similarity

is discernible. The shoulder blade of the anterior limb corresponds to that of man, the humerus to the humerus, the forearm to the ulna and radius of man; it will be seen that instead of the two separate bones of the forearm in the horse, there is apparently but one, that is the radius; still the ulna is present but not separate, only rudimentary and united with the radius. In man the two bones are fully developed and separate. The bones of the fore-knee correspond to the wrist of man, the canon bone to the metacarpal, the pastern, coronary and coffin bones to the three phalanges of the middle finger; thus the middle finger of the horse is most strongly developed, and it may be said that the horse steps on his powerful middle finger. The femur of the posterior limb corresponds to that of man, the leg to the leg of man. Still some deviations are found: whilst the leg of the horse has for its base one compact bone, the tibia and a small undeveloped bone, a rudimentary piece, the fibula, the leg of man consists of two separate bones, fully developed, the tibia and the fibula. The knee-joint of man corresponds to the stifle-joint of the horse, the hock-joint is nothing less than the heel of man, the canon bone of the posterior limb corresponds to the metatarsus; the pastern, coronary and coffin bone to the three phalanges of the middle toe of man.

From this comparison it is at once perceptible how incorrect the nomenclature of the separate bones of the horse's foot is, and how a revision is needed.

If a close examination of the bones of the horse's foot be made, it will be discovered that the canon bone (which corresponds with the the metacarpals of the human hand and the metatarsals of the human foot), is composed of three bones instead of one. On the posterior face of the canon bone two long pyramidal bones are attached which taper downward free; these must be accepted as remains of former toes, more so as the upper end has distinct articular surfaces and terminates in a small tubular knob which can be felt through the skin (and often erroneously taken for splints) and is nothing but an aborted joint. Consequently these splints must have played a certain role, and have served another purpose than at the present time, for the ob-

servant eye of the anatomist discovers muscles in their proximity which must have been the organs of motion of these bones. To-day these splints, together with their tender muscles, are useless, therefore they are called rudiments. Nature has, however, retained these bones as evidence that the ancestors of the equine race were possessed of a differently constructed foot. The splints, therefore, correspond to the second and fourth finger of the human hand.

The progenitors of the equidæ must be sought for in the depths of the earth's crust, where are their skeletons, proofs of former existence.

The fossil remains of the equidæ are found in thousands of specimens scattered in various parts of the earth, and in the course of many thousands of years, like all other animals, have been subjected to a continual, though imperceptible metamorphosis before they finally attained the present form and stature.

The horse of pre-historic time, that is in the Alluvium, was called *Equus Caballus* just as to-day, and wholly resembled the horse of to-day. His bones are found in caves and grottos, often accumulated in vast numbers; it was the wild horse which existed in company with the mammoth, rhinoceros, cave-bear, reindeer, gigantic deer, and was a favorite game of man.

In the Diluvium the ancestor of our horse was a soliped, and resembled the horse of to-day in most respects; however there was a difference in the teeth.

The oldest form of the equine race has been preserved in all three strata of the tertiary formation, pliocene, miocene, and eocene, still in the construction of the foot that degree of perfection characteristic of the horse of to-day was not developed.

On the fore as well as on the hind foot, the middle finger was most strongly developed; the horse, at that time, must have used the middle finger as he does to-day.

In the pliocene, the uppermost strata of the tertiary formation, we find the hipparion. These animals are characterized by the presence of the middle and strongest developed hoof; on both sides are two small hoofs, which, however, do not touch the

ground. The remains of the hipparion were found in Greece, France, Germany, Austria, Switzerland and Asia.

In a lower tertiary strata, that is the miocene, we find an animal called anchiterium resembling the hipparion, though it has a smaller head and a difference in the teeth. Each foot has three toes, which are small, but in comparison with the hipparion larger and better developed. Remains of the anchiterium are found in the gypsum strata near Paris, also in England, Germany and the Alps.

In a still lower tertiary strata, that is in the eocene, the form of the equine race deviates so much from that of to-day that it is very little like it.

The genealogical tree of our horses, which has been traced to the oldest strata of the tertiary, shows many deficiencies in Europe; that of North America, explained by Marsh, is much more complete.

According to Wilkens the paleontological history of equine-like animals in North America is as follows:

The oldest representative of the horse, as far as now known, is the small eohippus (the size of a fox) of the lower eocene, on whose fore foot are four well developed toes, and the rest of a fifth, and three toes on the hind foot.

In the next higher layer of the eocene the orhippus makes its appearance. This animal has a slight, though greater, resemblance to the horse type than the eohippus; the aborted fifth toe has already disappeared.

Near the basis of the miocene, a third species, messohippus, which is a degree more horse-like, is found. It possesses but three toes and an undeveloped bone-splinter on the fore foot and three toes on the hind foot.

Then a fourth form—miohippus, in the upper miocene, closely resembles the anchiterium of Europe. The three toes on the fore foot are nearly a size and a rest of the fourth bone is still visible.

The protohippus of the lower pliocene is very much like the hipparion of Europe. These animals possessed three toes, but the middle one only, corresponding to the single hoof of the present horse, touched the ground.

In the middle pliocene we arrive at the last degree—before the appearance of the horse of to-day—in the species of *pliohippus*, which have already lost the small conoid hoofs, and are in other respects very much like the horse. In the upper pliocene the true horse makes his appearance; in the after tertiary period it roams over the whole of North and South America, but becomes extinct long before the discovery of the new world. When this part of the world was discovered by Columbus, America did not possess a single horse.

By the above line of ancestors of the present horse it will be seen, that from the original three-toed protoplasts, in innumerable generations, a one-toed animal gradually developed. It proves that a continual endeavor existed to simplify the limbs; the side toes gradually grew smaller until they eventually disappeared entirely, and now the rudimentary splint-bones only remain.

We have now arrived at the last stage of the development of the horse, and it may be unnecessary to state that paleontology is to be credited with these discoveries, a science, which though still in its infancy, has revealed many valuable facts. As is known, paleontologists met with much opposition at the outset. Their views did not harmonize with those given in Genesis, whose advocates (particularly theologians), claimed that these fossil discoveries were evidences of the deluge; however, the geologists gradually furnished so many proofs in favor of their science, that it is impossible to refute the same. Still, Darwin's attempt to trace the lineage of man from the monkey has not at all events been accepted, as is shown in a discussion at a jubilee meeting of German naturalists and physicians held in 1878, at Munich. The instruction of youth in the higher branches was the topic of debate, in which three of the most noted scholars, Virchow, Naegeli and Haeckel participated. The former among other things said, "prudence demands that they endeavor to make sure of their ground by wise moderation, by a putting forward of those things which are established in the sight of all men, rather than individual opinions." In the course of discussion he also had occasion to refer to paleontological evidences, whereby it has been sufficiently proven that the horse is descended from a five-

toed ancestor, while Darwin, as we all know, has not been successful in finding the missing link showing that man descended from the anthropoid race.

The same writer has the following: The devil is said to have appeared to Cuvier and threatened to eat him. "Horns? Hoofs?" said Cuvier. "Graminiverous—Can't eat me." "All flesh is grass," replied the devil, always ready with that fatal habit of misapplying scripture which has always clung to him.—(W. K. Clifford in *Popular Science Monthly*.)

Now, gentlemen, if you will give me your attention a little while longer, I will give a few details which show the esteem in which this noble animal was held by our forefathers.

Buffon says, "Man, among all animals over which he claims lordship, could not have made a greater conquest than by domesticating the horse, this proud and fleet animal, upon which nature bestowed its most noble gifts, form, strength, courage, fleetness and endurance."

Upon discovering the advantage which the horse may render man over his opponent, and the more nations considered war, migration, and pomp the purpose of their existence, the prime of the horse's life began.

Facts based upon linguistic researches show that all descendants of the Aryans have the same root for the word "horse," therefore it is generally accepted as the main proof that the domestication of the horse took place first in Iran, the mother country of the Aryans, about 3,000 B. C., and from there the domesticated horse spread over the whole of China, India, Mesopotamia, Persia, part of Asia Minor and then gradually over the whole earth.

From the moment the horse was used for riding, its importance as a domestic animal reached its zenith. Its subjugation forms a highly significant epoch in the civilization of the nations. The superiority of the horse among other domestic animals is due to the fact that it was bred and used for war.

The invasions of wild cavalry hordes which stirred up whole nations, the wars that shook the earth and penetrated the whole of Europe, would not have been conceivable without the aid of the

horse. The training of the horse for riding purpose had the same effect, in a small way, as the introduction of the locomotive had upon the whole world.

In the earliest period the horse seems to have been used for draught purposes by individual tribes. At the time of Hoang-ti, of China, 2,698 B. C. it was in full use. The Egyptians were in possession of the horse 2,500 B. C., and from there it spread over North Africa.

The first mention of the horse in the Old Testament is in the following verses: "Joseph gave them bread in exchange for horses, and for the flocks and for cattle of the herd and for asses." Again, when the body of Jacob was taken to Canaan, "there went up with him chariots and horsemen." "And the Egyptians pursued and went in after them in the midst of the sea, even all Pharaoh's horses and his chariots and his horsemen."

Several centuries later, at the time of Moses, the people of Israel were forbidden to keep horses, in order to prevent their coming in contact with other tribes.

King David was the first of the Israelites to disregard this Mosaic injunction; he kept one hundred captured chariots and horses for himself. Solomon heeded the prohibition still less. He introduced the horse throughout the whole of Palestine, and with mercantile spirit monopolized a trade in horses, at which he did a thriving business. He imported 40,000 horses from Egypt at 150 silver shekels, or 17 pounds sterling per head. It was then that the kingdom extended in glory and in surface far beyond its ancient boundary.

Serostósis, when he conquered the Nubians, 2,300 B. C., had in his army 24,000 horsemen and 27,000 chariots.

The Moors from Africa, who penetrated Spain and invaded the whole of Europe, had over 200,000 horsemen.

The Egyptians introduced the horse into Greece. The first appearance of horse and rider caused the inhabitants to believe this strange apparition to be a supernatural being, and in this manner the centaur sayings originated. The mythology of all nations, and that of the Greeks in particular, contained many traditions of the horse, but I will not recount them here; they all

tend to show, however, that the horse was held in veneration, not only by the earliest inhabitants, but, as is seen in literature, later generations seemed to have been inspired to a great extent. Thessaly in northern Greece was inhabited by chevaliers whose cavalry was widely famed.

The famous charger Bucephalus, of Alexander the Great, was out of the stud of Philonicus in Thessaly. The animal was so wild, shy and refractory that no one could mount him, and King Phillip doubted whether anybody could manage him, but concluded to buy him provided his son Alexander, who was so anxious to possess so fine an animal, could ride him. Alexander succeeded in the attempt, whereupon Phillip paid sixteen talents for him. Bucephalus was regarded as an ideal being, endowed with the highest virtues of which a horse can be possessed. He died in his thirtieth year. In memory of his beloved horse, Alexander erected an expensive monument on the bank of the Hydaspus, and on the same spot he laid the foundation of the city Alexandria. This epoch of Alexander the Great suffices to mark a new period in the history of the horse. From Macedonia, the country noted in early ages for its fleet horses, the son of Phillip, like a meteor, swept through all the lands in which the horse was held in esteem; he conquered the Greeks, Thracians, Scythians, Egyptians, Indians; in one word he established the greatest Asiatic reign that ever existed. Not only through his conquests, but rather by his own personality is his history associated with the history of the horse. So closely is the life of Alexander knit with the life of Bucephalus that it would seem "useless each without the other."

During the time when the Olympic games were at their zenith, the horse rose to veneration, and Zenophon, who protested against such idolatry 44 B. C., said, "the horse is wiser than man, for had it gods it would certainly not give them the form of a human being, but that of its own, that is, the equine form." In the Olympics, the requirements of man and horse were so great, that the training of the horses was indeed an art. The arrangement of the competing chariots was decided by drawing lots. The chariot stationed on the outer side of the track was placed far-

theft back, while the one on the inner side was placed farthest forward. At one end of the track was a pillar which must be passed six times, making the whole stretch about six and one-half kilometers; the curve about this pillar was so short that great dexterity was required to accomplish this; in addition a figure called Taraxhippus stood near the track, the purpose of which was to frighten the horses. Above all a rock was placed on the track, that made the passage so narrow at this point, that the greatest care was needed to direct the horses through this narrow space. Both man and beast were exposed to the most thrilling accidents, and if a competitor was successful in avoiding all these dangers when making the circuit six times, he was deemed worthy of the laudation of his countrymen. The racing on horseback was less dangerous, but a remarkable regulation was, that the rider was obliged to leap from his horse before approaching the winning post, and run alongside of his animal. These Olympic games lasted from 777 B. C., until 393 A. D., thus 616 years.

In Athens and Sparta, certain privileges being conferred on horsemen, a higher class of society, namely that of the knights, was formed. Many an Athenian loved his horse so well that when he lost it by death, his own existence seemed worthless. Aristophanes writes, "horse-breeding has ruined me, a fearful consuming evil," and his father, who laments because his son has become a sportsman, said, "He would not heed my words, but through his love for horses has reduced me to poverty." The Medes and Persians are descendants of the Aryans, and 1,200 B. C. the Medes were renowned for their horse-breeding. Up to the time of Cyrus the cavalry king, 600 B. C., the Persians were not distinguished for their horses, but under his encouragement, horse-breeding was carried on extensively. Cyrus, the most magnanimous king of his time, was the first equerry; he instituted the mail service, he had the distance measured in which a horse could travel without becoming fatigued, and there he built relays. At each of these relays a commodious stable was erected, wherein a certain number of horses were kept, which were under the supervision of the most trustworthy and distinguished men of the land. Cyrus, as a rule, did not accept presents, but horses he

never refused. In Babylon the king possessed eight hundred stallions, to each of which twenty mares was assigned. Of the whole Persian kingdom Armenia was so rich in horses at that time that the Satrap sent twenty thousand fillies annually to the Mytra festival. White horses were sacrificed to the sun-god Mytra. The chariot of the sun-god was drawn by eight white horses and was the emblem of peace and justice. The royal chariot was drawn by four.

The Scythians, north of Thrace, were wild horsemen of Mongolian extraction. They sacrificed horses to their gods. They drew the blood from the femoral artery of the horse and drank it; also gave it to their children to drink, so that they would become valiant; they ate the flesh, drank the milk of mares and converted it into butter, cheese and koumiss, an intoxicating beverage. The fleetness of their horses was so remarkable that a horse of a common Scythian soldier could overtake the noblest Persian. Phillip of Macedonia, who conquered the Scythians, took twenty thousand horses from them.

The Italians or Romans also gave attention to all branches of culture, particularly to horse-breeding and horse-racing. Tarquin the First, who laid the foundation of the Capitol, built the Circus Maximus, instituted national festivals, combined with combats, in which the horse assisted his master to win the laurel wreath and thus increased his own fame.

From the beginning, horses were highly prized by the Romans, and to the time of Marius, the horse's head was their standard of battle. Pompey had in his army a mounted elite distinguished for its birth, wealth and bravery. At all times grand pageants and performances given in the circus were the principal amusements of the Roman empire. The Cæsars had a passion for horses and chariots, and during Nero's reign this passion was at its height. The aristocrats vied with each other in the splendor of their horses. "They had their heart and soul in the manger," and "the way to fame and office led through the stable," complained the non-riders. Cæsar 100 B. C. buried his horse, which fell in the battle of Pharsalia, in the same temple which he had erected in honor of his mother. The horse of Varus, 6 B.

C., had a palace and attendants for its own use, wore a purple mantle, received taxes and fed on raisins, nuts and barley. Caligula generally took his meals in the stable, his favorite horse had a stall of marble and a manger of ivory. Caligula appointed his consort priestess of the horse and intended to raise him to consulship. (Voltaire once remarked sarcastically that "the Roman emperor who appointed a horse as consul was not so great a fool as he who places blind confidence in unworthy men.")

Nero, 54 A. D., was the most expert horseman and charioteer of all the Roman emperors, and in his time the horse was more highly valued than other property and slaves. The Celts of Gallia and Helvetia gave great attention to the race of their domestic animals and paid high prices for beautiful horses brought into the country by merchants. When conquered by Cæsar, 55 B. C., the only request made by their conqueror was, that they be allowed to continue their horse-races. The following may illustrate the value of a reliable horse at the time of Clovic: When Clovic conquered the West Goths he made a pilgrimage to the grave of his holiness Martin, to thank God for the victory. Clovic presented the monks with the horse he had ridden on the day of his victory. There being a scarcity of good horses, Clovic soon regretted his generosity and demanded that the animal be returned to him for fifty silver marks, but the monks answered that his holiness prized his gift highly, consequently Clovic was compelled to double the sum to gain his end. Hereupon the barbaric Cymbrian muttered, "his holiness is very generous, that is true, but he is sure to be well paid for his kindness."

Perhaps the most brilliant period for the horse in France was at the beginning of the reign of King Louis XIII. Every castle, country place and villa had a fine pasture and stable attached, which was sometimes more comfortable than the castle itself. At that time, the highest dignitaries in the kingdom considered it an honor to have a position, if ever so insignificant, in the royal stud, and that of equerry was the most enviable in the land. With the abolition of the feudal system through Richelieu, the studs of the country noblemen were neglected and horse-breeding retrograded.

Under Napoleon I. very little or nothing was done to further horse breeding, and his hatred toward England was transferred to the English horse, for he never would mount an English thoroughbred.

With the accession of Napoleon III. royal studs were established, and 1500 stallions, mostly English, were purchased with funds out of the treasury of the government. Normandy is one of the provinces of France noted for its horses. The importation of the Norman horse into the United States has been carried on very extensively in the last thirty years.

In the seventh century the Oriental horse was transplanted to Spain, and by crossing with the Andalusians a new breed was obtained, which was valued as highly as the full blooded English is to-day. The nobility, whether lady or gentleman, was expected to be able to handle his horse, and the school of the Spanish step was the most elegant attainable. Once so rich in horses, Spain can to-day produce but few serviceable horses.

The Arabians of the present day trace the genealogical tree of their horses to the five steeds of Mohammed which rescued him in his flight from Mecca. To the Arabian, the pedigree of his horse is a matter of great importance. The tail of the newly born filly is rubbed so that it will carry it high. At two years of age it is ridden by boys and in the third and fourth year already roughly used, and in its fifth year it is considered perfectly trained, whereupon it undergoes a trial of several days racing, when judgment is passed upon it.

The stallions are generally in the hands of the Sheik. The ordinary man who possesses a steed is considered wealthy. As far as is known, no other horse than the present ever inhabited Arabia, and is the ideal of the fleetest, noblest and finest horse.

In Germany the holy forests were known as the first German studs, and the training of the sacred white horses was in the hands of the priests. At high feasts white horses and human beings were sacrificed. According to the old teutonic belief, the saints had their horse in Wallhalla, which they ride. Death itself is the pale rider.

When the swamps and morasses were frozen, races were held

in every province, to determine which were the best horses; these were then sacrificed to the gods; the second best the king kept for military services. To the time of Karl the Great the original German horse remained unnoticed. As the wealth of the monks increased and the best breeds of horses in Germany were to be found in cloisters, more elegant and gentle horses were raised.

Henry the Fowler, in the ninth century, instituted fencing on horseback and founded the tournaments. In the sixteenth century the carousal took the place of tournaments. Augustus the Strong held carousals on a grand scale.

During the eighteenth century, in consequence of the wars, horse breeding degenerated.

William Frederick II., being well aware of the necessity of becoming independent of foreign countries in regard to horses for the military, transferred the control of the whole stud to Count Lindenau in 1786, who began with the reorganization of Trakeleneu and the establishing of the Litthaneu stud, which gradually attained such fame. Of the breeds of Prussia, those of Litthau undoubtedly occupy the foremost rank; they have taken the place of the old and miserable race, and the horses now used are mostly from stallions bred in Trakehneu. This fine and noble breed, which is admirably adapted for light and heavy cavalry, as also for light harness, has given evidence of its serviceability in three wars.

The earliest records concerning the English horse date from the invasion of Julius Cæsar, at the time which British horses were crossed with the Roman.

Athelstan, son of Alfred the Great, is the first on record who, in 930 received German running horses as a present from abroad, and therefore had more particular opportunity of improving the English stock by the infusion of select foreign blood; he seems to have bestowed some attention on the subject, since he issued a decree prohibiting the exportation of horses without his license.

In a document of the year 1000, we find the relative value of horses in this kingdom, directing—if a horse was destroyed or negligently lost, the compensation to be demanded was thirty shillings; a mare or colt, twenty shillings; a mule or young ass,

twelve shillings; an ox, thirty pence; and a man, one pound. The trinal system of the ancient Celtic nations still continued in use at that time, and may be traced in the laws regarding horses; for to obviate the frauds of dealers, the following singular regulations were in force: the purchaser was entitled to time, in order to ascertain whether the horse was free from three diseases. Three nights possession to determine whether he was not subject to staggers; three months to prove the soundness of his lungs, and one year to remove all apprehension of glanders. For every blemish discovered after purchase the dealer was liable to a deduction of one-third of the money, excepting in obvious cases, such as where the ears or tail were defective. Compensations were likewise granted in cases of injuries done to hired horses. We find even among the enactments that "whoever shall borrow a horse and rub off the hair, so as to gall his back, shall pay four pence; if the skin be forced into the flesh, eight pence; if the fleeh be forced to the bone, sixteen pence."

In the year 1121, during the reign of Henry I. the first Arabian horse was introduced. Notwithstanding the decree forbidding the exportation, which existed since the time of Edward III., this king favored a German by allowing him to buy several horses and take them with him to his own country. Toward the end of the fifteenth century Henry VII. allowed the exportation of inferior stallions and mares.

Under Henry VIII. the neighboring magistrates were ordered at Michaelmas tide to "drive" all forests and commons, and eradicate all horses which were under size; by this measure, however, horse breeding deteriorated and Queen Elizabeth, a short time after him, could muster only 3000 in her cavalry. Gradually England made great progress in the improvement of the horse, and under Queen Victoria Great Britain enjoys the reputation of being second to none in the world in horse breeding, and its fame in rearing and improving breeds will be handed down to posterity.

Richard III. once said, "A horse! A horse! My kingdom for a horse."

Now there are horses with which kingdoms could be bought, horses which whirl up gold dust from under their feet, horses

whose gallop overthrow old baronies and build up new castles. The horse race! . A magic word, which stirs up the heart, the spirits of a whole nation by a great deal more than in the days of the Olympics, where an ivy wreath was the reward of the victor, when a young and poetic people found pleasure in the noble horses of Elis, and at the same time in the songs of Homer and Orpheus.

The thirst for the unknown which consumes civilized man has never been better quenched than by the uncertain eventualities of the turf; this mathematical study as to the fate has never been carried to such an extent as in a stud book or in a racing calendar.

The horse was the original symbol and instrument of chivalry, an institution which flourished in the middle ages in England, France and Germany.

The knights bestowed great attention and care upon the breed and training of their horses, and all kings and princes issued proclamations to the effect that the landed estates of all chevaliers who defend their country with the sword and helmet are free from taxation, provided they furnish weapons and horses for the service and protection of the fatherland.

A chevalier stood in the same rank as a prince, and it has been noted that many titles are derived from the word horse, or the use to which it was destined. Chevalier, from the French cheval; Ecuyer, from the Latin equus; Marquis, Marechal, Marshal, from the Celtic and German March; Countable, from the Latin cones stabuli—provost of the king's stable; Duo, chief of the cavalry.

Cities were also named after studs, as Argyle in Scotland is presumed to be derived from Are-gael, the breeding or horse stud of the gael. Brovisel is said to be derived from broeden—breeding; Broisel—for such is the interpretation of Brussels—the site where the city stands being anteriorly a breeding pasture, formed by the Counts of Lonvain before Brabant was raised into a Duchy. Stuttgart in Wurtemberg has its name from Stuten-garten.

In the early ages and to the end of the first thousand years, the horse was mainly used for war. During the last centuries its original purpose became more and more diverted until at last it is

destined to serve in the interest of peace. As the commercial intercourse widens, the supply of horses is inadequate, and the continual progress in agriculture gradually demands a greater number of more steady and tractable animals, whose principal qualifications consist in the development of great strength. To-day, the importance of the horse as a domestic animal has increased, but as regards historical significance it has lost, inasmuch as it has no longer the only factor for the transportation of nations. Steam has superseded it.

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## KERATITIS CONTAGIOSA IN CATTLE.

BY FRANK S. BILLINGS,

*Director of the Patho-Biological Laboratory of the State University of Nebraska.*

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This is not a new disease by any means, so far as the United States are concerned, nevertheless I have been unable to find any description of it in the literature at my command.

While new to myself until the last summer, there have been quite a number of reports of its existence, and complaints about it from farmers and breeders of cattle in some of the live stock journals of our western States. Under the circumstances it would seem that a description of its clinical phenomena and gross pathological lesions may not be without scientific interest to the ophthalmologist, and have some practical value as well, especially as experience has shown that the extension of the disease over the members of a herd of cattle can be easily prevented by isolation measures, and its course much shortened by the mildest and simplest therapeutic treatment.

*History.*—During the past year three quite extensive outbreaks have been reported to me in Nebraska; one having been at Kearney, and another at Gibbon in Buffalo County, while a third occurred in the immediate vicinity of Lincoln, thus giving an opportunity for some personal observations. Of the outbreak at Kearney the owner wrote me that the trouble appears to begin as a small spot on the eye-ball, the eye running and gradually growing worse, showing a purplish color, and becoming very sore; the

pupil seems to protrude as though proud-flesh, or something of that nature grew in the center ! The above will be found to be an unusually good description from the hands of a layman.

The disease first appeared in the vicinity of Lincoln, in a herd of dairy cows, about July 1, 1888. Its extension over them was very slow indeed, and although there were several horses among the cattle, or exposed to more or less danger of infection, the disease did not extend to them, nor to the men milking and caring for the animals. Up to October first ten cows, out of about seventy-five, and seventeen calves, had become affected, when my observations had to cease on account of important engagements elsewhere.

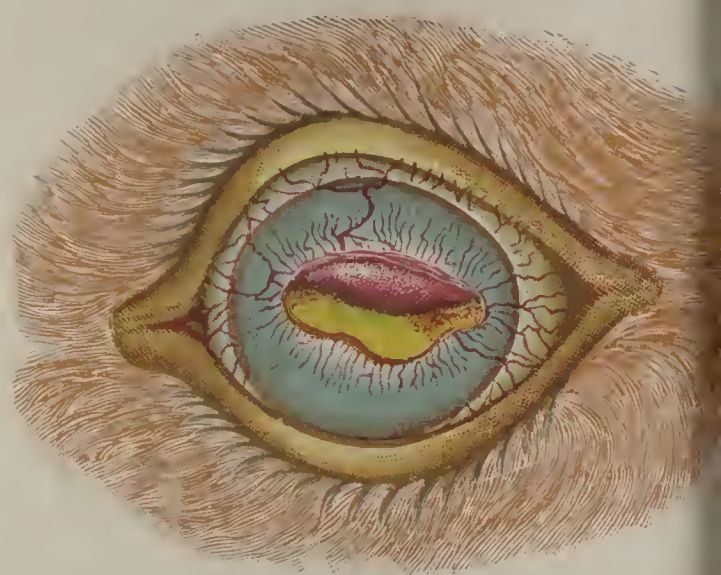
*Clinical phenomena and gross pathological lesions.*—The disease first manifests itself by the discharge of a thin, clear watery fluid from the conjunctival sack ; marked photophobia is an early symptom, the eyelids being closed and somewhat swollen, though the afflicted animal can open them easily enough if startled, and has complete control over their movements ; the discharge rapidly increases in quantity, the conjunctiva becoming more and more swollen until, in some cases, the engorgement of the vessels become so intense, that its general color is almost a diffuse copper red ; (this has not been shown in the accompanying illustrations on account of the unfortunate necessity of all possible economy in the number of cuts ;) in very severe cases the discharge becomes purulent. While a careful examination of the diseased animals has shown that the rise in temperature is but very slight, still they present phenomena which the casual observer might mistake for those of high fever ; their heads are held depressed, the ears become pendulent, and they refuse to eat and rapidly emaciate, while the yield of milk lessens materially ; these conditions augment during the first eight or ten days ; the photophobia correspondingly increasing ; instead of fever, they must be attributed to the severe pain which the animal is suffering ; intra-ocular pressure is present to an excessive degree, but the cause thereof is entirely to be sought in a marked increase in the quantity of fluid in the anterior chamber of the eye, the corner of which becomes distended and very prominent. While the disease has



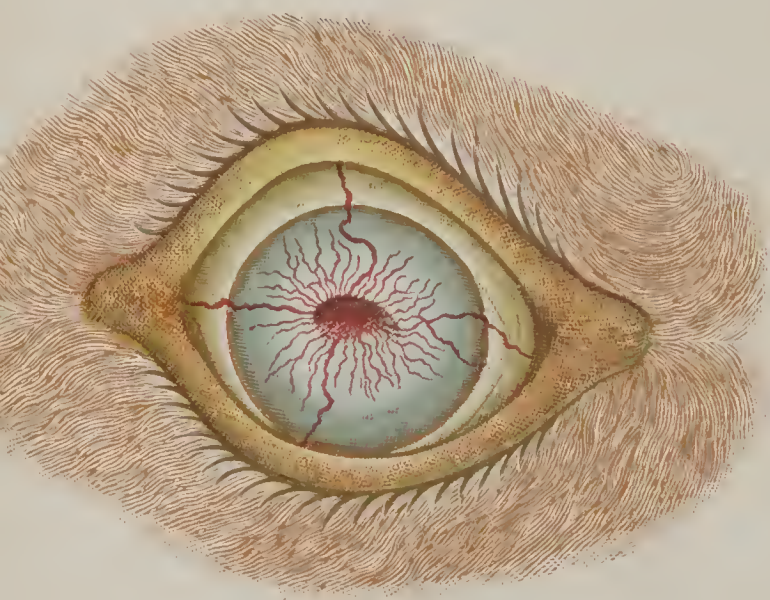
*Fig. I.*



*Fig. II.*



*Fig. III.*



*Fig. IV.*



KERATITIS CONTAGIOSA IN CATTLE.

never been reported to me as beginning in both eyes at one and the same time, still in almost all cases it has been noticed to extend to the other eye. At about the second or third day from the time the first eye has been observed to be affected, a very delicate cloudiness makes its appearance at or near the center of the eye, which continually increases, the membrane becoming thicker and thicker, and more and more opaque, which conditions gradually extend to the sclerotic edges; this center is at first of a pearly white color, and in some cases may not become more than a creamy white, being much thickened, but in many a small yellowish speck will be seen to form, which gradually becomes larger, the tissues over it becoming thinner and thinner; this yellowish spot will be seen to be surrounded by a wall of thick, swollen, indurated tissue of a white color, while outside of this wall will be more or less pearly white substance, losing itself in a bluish white tissue as the peripheries of the cornea are approached; see Fig. 1. (It will be self evident that all three fine points of shading could not be illustrated to perfection except at great expense, hence the reader must make due allowance for illustrations in which it has only been endeavored to show the essential points). From this indurated tissue, which encloses the apostematous center, may be seen numerous delicate blood vessels taking their course, in a serpentine manner, towards the sclerotic edges of the cornea; this vascularization is often so intense as well as so delicate in the character of the neoplastic vessels, as to give to the tissues a diffuse dark red color, even to the degree of hiding the larger vessels from sight; in fact, so extreme may this become that it will take careful observation not to be misled in assuming the existence of an excessive intra-corneal hemorrhage completely filling the anterior chamber of the eye. *The latter never occurs however.* As the processes increase in intensity, the yellowish center increases in extent, and always in a direction across the eye from side to side, and then below the same will be seen a mass of intensely vascularized tissue, much swollen, but still the overlying tissues will retain their normal lustre, or nearly so, while those over the yellowish center have become very thin and lustreless (Fig. II.); in many cases these abscesses rupture and the contents

at once escape; the rupture is invariably of the external tissues at first, the augmented amount of fluid in the anterior chamber exercising a perfectly equal pressure against decemetic membrane, preventing a rupture in that direction; but when the abscess has been unusually extensive, the tissue forming its inner wall are too thin to resist this pressure, and a rupture soon follows with escape of the aqueous humor, and prolapsus of the lense followed by the utter destruction of the complicated organ. In the majority of cases this fatal termination does not occur, but from the ruptured edges of the external walls and base of such an abscess the development of granulation tissue begins and extends across the cavity, completely filling it up and projecting to a considerable degree beyond the level of the surrounding tissues. Naturally the size and shape of this mass will vary with the size and shape of the original abscess and extent of the rupture. Such conditions have been illustrated in Figs. III. and IV. From these granulations the previously mentioned vascularization may be seen extending in all directions towards the peripheries of the cornea. To one observing this disease for the first time, and before a complete examination of a severely complicated eye has been made, the most natural hypothesis would be that there must also be very extreme complications of the internal portion of the organ. He would find himself entirely mistaken, however! *Aside from an œdematous condition of the iris, the internal portions of the eye remain absolutely normal.* Even the aqueous humor, while increased in quantity, remains as clear and pellucid as the clearest of distilled water, as I have tested in every case by the careful withdrawing of the same with a sterilized glass barreled syringe; the most exact microscopical examination has failed to reveal the presence of a single leucocyte.

*Termination.*—Singular to say, notwithstanding the apparent severity of the external lesions, with the exception of the rare cases in which complete rupture of the cornea with prolapsus of the lense occurs, there is, or better perhaps, has been, an absolute return to normality and complete reacquisition of sight. Where no rupture has occurred, or where there has been no accumulation of pus, the first step towards restoration is a decrease in the cali-

bre and number of the neoplastic vessels, with a clearance of the cornea at its peripheries, which slowly but surely extends toward the centers, until the entire organ is again as transparent as could be desired. Where there has been a rupture and the cavity caused thereby filled by granulation tissue, the same process occurs, and the same phenomena are seen, the vascularization decreasing, and the granulation tissue becoming more and more anæmic and less and less prominent, until it finally entirely disappears, its place being at first represented by a yellowish white, then white, and finally opaque pearly spot, which eventually disappears entirely, epithellium having again completely covered the spot, and restitution is perfected in a manner seldom if ever seen in any process of wound healing where the previous lesions have been of such apparent severity.

I will here remark that all these conditions have been followed step by step by microscopical studies made upon eyes removed at every distinct phase of the disease, but that it is my purpose to reserve their description for another paper, as well as some remarks as to a micro-organism present in the tissues. Cultivation attempts have thus far been futile, however.

*Nature.*—The extremely slow manner in which this disease extends over a herd of cattle has been previously mentioned. No less remarkable has been the (in my experiments) absolute impossibility of intentional transmission of the disease from afflicted to healthy animals. For example, completely sterilized plugs of absorbent cotton were placed in the conjunctival sack (of a bull recently affected, but with a very profuse discharge) until completely saturated; in one case such plugs were placed within the same sack of the eye of a healthy calf, while in another the cornea had been previously scarified with a sterilized lancet; notwithstanding the lids were held closed for five minutes in each case by attendants, *the results were absolutely negative*. The aqueous humor of the eye of a diseased calf having been withdrawn with a sterilized syringe, was injected into the anterior chamber of the eyes of a rabbit, and, as well as possible, into the tissues of the cornea of another, with the same unsatisfactory results. They do not, however, have any value as evidence against the conclusion that

the disease is of a contagious character. For this, its appearance in a single individual, at first, and its very gradual extension, while were it due to any specific, though external cause, where all the animals are banded together and have the same treatment, a more general eruption would certainly occur.

*Prevention and Treatment.*—Complete isolation of the diseased from the healthy animals will cut off the extension of an outbreak with the most happy results. All the treatment necessary is a dark place, and cloths constantly hanging over the eyes, kept wet with cold water all the time. This treatment lessens the severity of the disturbances, and hence tends to shorten the period of restitution.

The application of any washes or remedies inside the conjunctival sack is not only useless but harmful, as the animals resist it all they can, and hence the danger of the introduction of irritating foreign material is increased, and even the endeavor to lift the lids, or handle the eye must be looked upon as having an injurious tendency.

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## PARTURIENT APOPLEXY.

BY T. D. HINEBAUCH, V.S.

*Extracted from Bulletin of Experimental Station of Indiana.*

*Synonyms.*—Parturient Apoplexy, Milk Fever, Puerperal Fever, Calving Fever, Dropping After Calving.

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*Causes.*—The causes are predisposing and exciting. Among the first may be mentioned high condition; well fed cows, especially heavy milkers, suffer most seriously and extensively from this disease. One attack usually predisposes to another. Age has a great influence, parturient apoplexy being most often noticed from the third to the seventh calving. The exciting cause is the act of parturition.

*Symptoms.*—The first symptoms are usually manifested at from one to three days after calving. The sooner they are developed the more serious and fatal will be the disease. There will be diminished secretion of milk, hanging of the head, loss of

appetite, and paddling with the hind feet. As the disease progresses the breathing becomes hard and loud; there will be knuckling in the fetlocks, and finally the animal drops; will perhaps rise, then drop, and will be unable to rise again; breathing becomes slower, accompanied by a peculiar moan. The eyes are blood-shot, wild and staring; the ears, horns and forehead hot, the extremities cold. At first the cow dashes her head about violently, but finally becomes quiet and insensitive to surrounding objects. The head will be thrown around, resting against the side with the nose upon the ground. In some cases the cow lies on her side with the head and legs outstretched. The power of swallowing may be lost or imperfectly maintained. The pulse, at first full, gradually becomes quick, small and almost imperceptible. During the first stages there is slight fever, but the temperature soon falls below the normal; the bowels are constipated, with retention of urine. These symptoms will run their course in from two to twenty-four hours.

*Treatment.*—The treatment which I recommend is that which I have successfully used the past two seasons, and which can be applied by any one who handles cattle. My attention was first directed to it by an article in the *London Veterinary Journal* for August, 1887.

The first thing necessary is to place the animal in as near a naturally recumbent position as possible, keeping her in place with bundles of hay or straw. Place a rope around the horns and fasten the head so that it will be held in a natural position, then give at once (1) twenty to thirty ounces of whiskey or a pint of brandy, well diluted with warm water. About half an hour afterward administer (2) from one to two pints of good molasses dissolved in hot water. The molasses creates thirst; the animal will drink greedily two or three hours after it has been given, and should then be allowed plenty of good pure water. Apply plenty of ice or cold water to the head. If cold water, see that it is applied every ten minutes. A common grain sack wrung out is very good. If the cow is inclined to keep dashing her head about, apply a check rope to the horns, in order to keep her from bruising her head or breaking off the horns. Do not at-

tempt to draw the milk, for there is none secreted. If the animal is not comatose, repeat the dose (1 and 2) in four hours, and continue doing so every six hours until you see her recovering. In my experience, with one exception, I have never given more than two doses, one sometimes being sufficient, recovery usually taking place in from twelve to thirty-six hours. Pure alcohol in one-half the dose may take the place of the whiskey or brandy. The body should be kept warm with plenty of light woolen blankets.

Veterinary surgeons or those who have hypodermic syringes will get excellent results by injecting ten grains of pilocarpin combined with two grains of physostigmine (eserine), in which case remedies 1 and 2 need not be employed.

Intertrachial injections give better and quicker results than when injected under the skin.

If the above treatment is resorted to in the early stages of the disease, before the power of swallowing is lost, nearly every case will recover.

*Prevention.*—This disease is easily prevented, but somewhat difficult to cure. For two weeks previous to calving diminish the food. Keep the bowels active by small doses of epsom salts or a laxative diet. Avoid all highly nutritious food. The common practice with some people of giving extra feed at this period to increase the flow of milk is, without doubt, the most prolific cause of this disease.

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## THE USE OF NARCOTICS IN PAINFUL OPERATIONS.

BY PROF. DR. ESSER.

Translated by John Faust, V.S.

He enumerates the many painful operations on domestic animals necessarily prolonged in operation. His experience convinces him that all operations under narcotics can be done more successfully and in less time than without them. The following is the method used by him on over two hundred horses, with uniform and satisfactory results: He used ether and chloroform together, and most generally a third, namely, morphine.

A few minutes before the operation he injects 0.5–0.8

gram. morph. hydrochlor. He next throws the animal, and then uses the narcotics. Out of the many methods of etherizing he uses the following:

He places a cloth under the upper lip, turns it over the nostrils and pours on the chloroform and ether. He has used this method ten years with the most gratifying results. The use of sponges, the Doctor says is always associated with a great amount of struggling, and invariably a nasal catarrh follows that method. The average amount of chloroform a horse is 100 gr., and especially, as mentioned before, if an injection of morphine preceded. In the two hundred mentioned cases, he never had any bad effects from its use. He always excludes heart-disease, very fat horses, and analmia in his use of narcotics. He is very particular that nothing prevents the free respiration. In case of any irregularity in breathing, he stops the chloroform, and uses artificial respiration, and dashes cold water over the head. This method has always proved satisfactory. A second narcotic is mentioned by him, namely the chloralhydrate, but in his experience it never produces complete anæsthesia. It was used in the following manner: From 100 gr. to 160 gr. in flaxseed decoction and injected into the rectum. He followed the advice of Cardeac and Malet, and combined the morphine with it, and used it as follows:

First the morphine injection. Then from 70 to 80 gr. chloralhydrate injected per rectum with the flaxseed decoction. He used this with satisfactory results on over thirty horses, but positively states that he never produced complete anæsthesia with chloralhydrate and morphine as he did with chloroform and ether. Nevertheless, he advised the use of chloral in such cases where chloroform and ether are dangerous. He closes with emphasis and appeals to humanity, that we, as veterinarians, should make more use of narcotics than we have done. The esteem and elevation of our profession can thereby only be obtained.—*Der Thierarz.*

## PHYSIOLOGICAL PATHOLOGY.

## ON THE CONTAGION OF OVINE VARIOLA.

BY M. PEUCH.

1.—*Virulency of the milk of varioloid ewes.*—Among the questions relating to the contagion of this disease, that of the virulency of milk has never been fully elucidated. It is known only that lambs suckled by ewes affected with variola at times take the disease; but, in this case, the effect of the milk in complication with that of the cohabitation is involved, and consequently, to determine whether any separate action has taken place in the milk, it is necessary to know if it has possessed any virulent properties. In investigating the subject with this view, the following experiments were made:—The milk obtained from an ewe inoculated fourteen days previous with variola, and which had, as yet, no eruption on the udder, was injected under the skin of three ewes, and the inoculation was followed by an eruption of variola, a large pustule appearing at the point of insertion. But two other ewes, treated in the same manner, remained healthy, and yet were refractory to infection, as was proved by direct inoculation with the pure virus.

These experiments show, 1st, that in variola the milk is virulent, and, 2d, that the effects of the virulency are manifested only by the inoculation of a large quantity of the material injected, and that the intensity of the effect is in proportion to the quantity of virus inoculated.

2d.—*Animal Species Susceptible to Variola.*—According to Zundel, it is transmissible to goats, to cattle and to rabbits, though most veterinary writers consider it specially characteristic of the ovine family. Gatier, while of the same opinion, thinks that in some cases it may, “though with difficulty, be transmitted to goats, and perhaps to bovines, or even to rabbits and fowls.” In elucidating this question, the author inoculated a goat, four heifers and sixteen rabbits with fresh and very strong virus. The inoculations were made both under the skin and under the epidermis, but none of the animals, except the goat, experienced any effect from the inoculation. Some small furunculous pim-

ples appeared at the point of inoculation, but no disease could be produced by direct inoculation with the fluid contained in these furunculi. According to these experiments the disease is not transmissible either to cattle or to rabbits, at least by the sub-epidermic method of introducing the virus.—*Journ. Soc. Scientif.*

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### MICROBISM AND ABSCESESSES.

BY MR. VERNEUIL.

It is held, to this day, as the result of former studies, that pus is not exclusively characterized, in its anatomical point of view, by its corpuscles, since it also contains microbes, which on account of their frequency, seem to belong to general pyogenesis. According to all appearances, they form its unique and real cause, as when experimentally introduced in the organism, they give rise to suppuration and to abscess.

Pus is at times *mono-microbic*, and contains but one kind of microbe, and again may be *poly-microbic*, and contain several different kinds and species.

In the first case, there is no doubt in respect to the pyogenic property of the microbe found; but in the second, it has been impossible, as yet, to decide whether all the microbes observed or only a portion of them are liable to produce suppuration. Until this problem is solved, the author thinks it proper to divide the microbes now known and found in abscesses, into two categories, the first including those which are so often, so singularly, and so commonly observed in suppurations, that they are properly considered as normal and necessary, if not exclusive, and which may consequently be denominated *pyogenic microbes proper*; while the second class consists of those which are but occasionally and irregularly encountered, and may be called *microbes accidentally pyoculous*.

By this method the old classification of abscesses, based more upon the results of clinical observations than referring to the origin of the causes and nature of the diseased process, is replaced by a more natural and a simpler theory, based upon the etiology of the pyogenesis as well as upon the pathological ana-

tomy and physiology of the abscess and its contents, and the following division is accordingly proposed:

First.—The *simple abscess*, developed under the unique influence of normal pyogenic microbes, containing no others, and exclusive of all others.

Second.—The *infected abscess*, due to the influence of either normal pyogenic microbes, or of pyococcus microbes, evidently pyogenic, but characterized by the presence of this last with all the consequences of this microbial juxtaposition.

This division has a certain parallelism with the old method of *idiopathic* and *symptomatic* abscesses, but is preferable because it is better defined, and rests upon the precise presence of the elements which give to the pus its various characters.—*Journ. Soc. Scientif.*

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## REPORTS OF CASES.

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### EZERINE.

BY W. H. PENDRY, D.V.S.

On March 3rd I was called to see a bay gelding, five years old, said to have received an injury in running away. I found the horse down, laying perfectly quiet, being unable to rise, the hind legs when lifted would lay just where they were placed, there being no sensation on pricking. The history I received was that he was one of a newly bought team, that he had shown a very nervous disposition that morning and that while being driven had shied at something, got the best of the driver, and run into an iron fence, which was badly broken; the bay dropping down with apparently only a slight flesh wound of the thigh, made by a portion of the broken iron rail. I made an examination of the back for injury to the spine, but could find no indication of any; not being able to find a specific cause for the loss of power behind. I declined to order the destruction of the animal, stating that it was possible that it was due to nervous shock. The owner's stable being near, I had him removed in the ambulance and placed in a well littered box stall, made a more careful examination and could find no visible injury, except the

wound spoken of, which was about two inches deep, and a soreness on the off side, back of the ribs. I took the temperature and found it to be remarkably low,— $91\frac{1}{2}$ —pulse weak. I gave an intravenous injection of alcohol and attempted to sling, but I found it useless. I had the patient well bedded down, mustard applied to spine, and before leaving, injected hypodermically about a tenth of a grain of atropia in solution. Visited again in about five hours and found him easy, circulation apparently much improved, resting well, drank about half pail of water, bowels having recently operated. Next morning found heart beating violently, temperature  $95^{\circ}$ ; injected hypodermically two minims tincture aconite, which very soon had a quieting effect on heart. The muscles of the gluteal region responded to pricking. The following day found patient resting well, neighed for water, which he drank, breathing easily; action of heart and temperature normal. Injected introtrachea two grains eseridine, had patient turned over, and ordered to be notified by telephone of any change. I received word about six hours after to the effect that things were about the same and that there had been no passage of the bowels. Next day temperature normal, unmistakable return of sensation to the hind quarters. On pressing hind legs from foot, could feel considerable pressure being given, and on examination of wound in thigh, slight movement of hind legs could be noticed. Gave intravenous injection of one grain of eseridine. Saw case same evening, resting quiet, had evacuation of bowels. Early next morning received word that patient was very uneasy and breathing hard, and on visiting found as reported. Horse neighed; gave water, which he was unable to swallow; as case was evidently hopeless I pithed, deciding to hold the post mortem as soon as possible, which was next morning and resulted as follows:

On removing skin the only visible contusion found was one on the off side. A careful examination was made of the spine for fracture, etc., but not the slightest injury could be found; dissection of hind leg and abdominal cavity gave no solution; on opening thoracic cavity found nothing except both lungs passively congested, but the outer membrane of the off lung was of a very

bright green, not extending into the lung tissue. I was curious to see if the intra-trachea injection of eseridine had had any effect on membrane, so made a longitudinal incision and found the posterior half of the trachea of the same bright green color, just as if a paint brush had been taken from one end to the other, touching only the back half. I then dissected spinal cord, but could discover no abnormal condition, so that the only satisfaction I received was verifying my opinion as to no injury to spine; offset by a ponderous interrogation of the whole case.

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#### DENTAL EXOSTOSIS.

BY FRANK ALLEN, *Student*.

On the 9th of February an aged bay gelding was brought to the American Veterinary College for dissecting purposes and on the 11th of February, when placed on the table and about to be destroyed his breath was found to have a most offensive odor, and a muco-purulent discharge was observed from the left nostril; he had eaten all right from the time he was brought in, but no previous history could be obtained. The diagnosis of a decayed tooth was made and on post mortem the following lesions were observed:

The fourth upper molar on the left side was found loose and a very slight pull with the fingers brought it from the alveolus, which was extensively diseased and ulcerated, the mucous membrane and hard palate was thickened and discolored round the diseased tooth. On making a transverse section of the skull at the level of the fourth molar there was noticed between the superior and the turbinated bones, in the middle meatus, an irregularly shaped bony mass about two inches in circumference and weighing between two and three ounces; it was one and a half inches from the roof of the diseased molar. The pressure of this mass had caused necrosis and absorption of part of the superior turbinal and partial absorption of the nasal bone above it, making a shallow depression not noticeable from without. The septum nasi, on a level with this mass had a circular hole the size of a fifty-cent piece, communicating with the right nostril, and the whole of the mucous membrane was thickened and congested. The bony

partition between the inferior maxillary sinus and the nostril was absorbed, clearly showing that at one time the growth had been attached to the fang. The crown of the molar was perfectly normal. On making a section of the mass it appeared to be composed of material resembling crusta petrosa.

John Tomes, in Dental Physiology and Surgery, says: "Dental exostosis is caused by irritation of the periosteum, due in a great majority of cases to caries, and arises from the crusta petrosa."

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## EXTRACTS FROM FOREIGN JOURNALS.

### CONTAGIOUS PLEURO-PNEUMONIA OF GOATS.

BY MR. DUQUESNOY.

Two sickly female goats were introduced amongst the animals of a flock whose milk was sold in the streets of a city of Southern France. A few days later four of these goats had died, and all the animals were more or less sickly. They ate less, gave less milk, coughed, and had a discharge from the nose.

Two of the worst cases presented the following symptoms; Great emaciation; skin dry and warm; eyes sunken and running; conjunctiva injected; a discharge from the nose, abundant and gummy; mouth warm and congested; breath offensive; respiration difficult and painful; cough frequent and deep; pressure on the chest and percussion painful and dull; pulse 120; lactation and rumination suppressed; diarrhoea foetid and greenish; temperature 103°.

*Post-Mortem.*—Intestinal tract about normal; both lungs hep- atized; in the right pleural sac, effusion and pleural adhesions; on the left, adhesions only; sections of the lungs show a mar- bled appearance, of various colors, forming spots of a reddish and brownish aspect, separated by infiltrated and hypertrophied inter- lobular connective tissue; the pericardium congested, with some ecchymotic spots on the cardiac serous membranes.

From the symptoms and the lesions, the author concludes up- on a diagnosis of contagious pleuro-pneumonia.—*Journal de Zootechnie.*

## INFECTIOUS PNEUMONIA OF HORSES.

BY MESSRS. CHRANTEMESSE AND DELAMOTTE.

This disease is very common in some parts of Europe, especially in France, where it prevails under an epizootic form amongst young horses of three and five years of age, and is in many cases very fatal. Those which recover obtain immunity. The authors made punctures in the lungs of two living horses with a sterilized trocar, and they found in a culture of the pleural liquid, and from the pulmonary fluid, a microbe, having pathogenic properties and characters still undescribed. This organism was found in great quantities and in the pure state, in sections of the diseased lungs. It readily colored by the method of Weighert. It belongs to the class of streptococcus, but is distinguished from those already known by its great virulency, and by its property of dissolving the serum which it produces in the animals where it grows. A drop of culture inoculated under the skin of the ear of a rabbit killed him in thirty-six hours, without leaving any trace of supuration. A short time before death the blood escapes from the mouth and nose of the sick animal, and at the post-mortem an abundant exudation formed of serum which had dissolved the hemoglobine was found in the pleura, the pericardium, the peritoneum, etc. Half a drop of culture in the trachea of a rabbit killed him in twenty-four hours, with a generalized broncho-pneumonia.—*Journal Soc. Scientif.*

## CHLORHYDRIC PILOCARPINE IN ACUTE LAMINITIS.

BY MR. FRUS.

The author has employed this drug with success in the treatment of this affection, and reports thirteen out of fourteen animals laid up, as making a complete recovery in from twenty-four to thirty-six hours. The dose, injected in the sub-cutaneous cellular tissue, varies between forty and seventy-five centigrams. Only two cases required a second injection. A strict diet and stimulating frictions of camphorated alcohol is also indicated.—*Deutsche zeitschrift fur Thiermedizin.*

## PROLAPSUS UTERI IN THE COW.

BY MR. KOUBELDA.

A case of this nature had resisted all forms of manipulation, and as a dernier resort, the following treatment was adopted, with perfect success. After carefully washing the mucous membrane with a solution of alum, the operator procured a large snowball, which he pressed against the organ at its most dependent extremity, slowly pushing it inwards and upon itself. This, however, appearing to work with difficulty, the organ was pushed upwards and inwards with a deep plate full of snow pressed against the vulva, while with both hands the mass was compressed and guided, and a few minutes perseverance in this manipulation effected a complete reduction. A few balls of snow pushed into the uterus and replaced by others as soon as they are dissolved, may always be relied on for effecting a complete recovery in similar cases.—*Mon. des Vereines der Thierarzte.*

## TREATMENT OF BOVINE ACTINOMYCOSIS WITH IODIDE OF POTASSA.

BY MR. FURTHMEYER.

This affection is very difficult to cure. Professor Thomassen claims that it is only in cases where the local application of iodine is combined with the internal administration of iodide of potassa that recovery can be looked for. Mr. Furthmeyer has prescribed the iodide to three cows affected with actinomycosis, giving ten grammes daily in a quart of tepid water. After the first dose, one of the cows stopped eating for twenty-four hours and the salivation diminished in all of them on the second day. On the fourth day it had entirely stopped, and at the same time a general eruption, with abundant thick mucous nasal discharge took place. The treatment was then suspended for two days, and resumed and continued again for six. The yellowish ulcers which existed before the treatment had become whitish, hard and painless to the touch. One of the cows lost the entire lingual epithelium. The disease disappeared, seven animals which were treated in the same manner all recovering.—*Ibid.*

## TREATMENT OF TETANUS.

BY DR. MORET.

Translated by F. W. Turner.

The treatment consists in taking a rubber tube, about five feet in length and half an inch in diameter, one end of which is drawn over the neck of a long two ounce bottle, containing six drachms of ether, and the other end is introduced into the rectum about eight or ten inches. The bottle is then placed in a can of boiling water, and the ether is slowly evaporated, which will be accomplished in about fifteen or twenty minutes. This procedure is repeated four or five times a day; and to improve the treatment, half an ounce of chloral is given once a day in a liquid bran mash. Besides this, the patient is to be placed in a commodious box stall, and kept completely dark. The result of the treatment will soon show itself. Under the constant influence of partial anæsthesia, the temperature will soon commence to fall, the pulse falls below the normal in the course of two or three days, the spasmodic contraction becomes gradually less, and in twenty to twenty-five days we may look for recovery. From six horses, treated in this manner by the writer in a year, five completely recovered, of which two suffered from complete tetanus, and three from trismic tetanus.—*Der Thierarzt*.

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## COLLEGE COMMENCEMENT.

AMERICAN VETERINARY COLLEGE.

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The fourth day of last month was the occasion of the commencement exercises of the American Veterinary College, and Chickering Hall, as in previous years, was the place selected for the observance. The stage was handsomely decorated with numerous magnificent floral designs, and the excellent orchestra of the Seventh Regiment executed a selected programme composed of the choicest gems contained in the repertoire of that unsurpassed band. The meteorological conditions out of doors were decidedly adverse, the rain pouring in torrents, though not quite in sufficient floods to drown out the interest of a sufficient number

of the friends of the college and relations of the students to overcrowd the spacious hall, which they more than filled. Punctually at eight o'clock, the Board of Trustees, led by President F. D. Weisse, M.D., and followed by the entire Faculty, entered the room by one of the side doors, while by an opposite entrance appeared the graduating class, led by its marshal. The officers of the college ascended the platform, and the inchoate graduates found their assigned places in the front seats of the parquet. The opening prayer by the Rev. Dr. Duryea was followed by the act of conferring the degrees by the President of the Board of Trustees, the names of the successful candidates being announced by Professor A. Liautard, the dean of the faculty. Forty-three graduates responded to their names, and received the much-coveted diplomas. These were:

Allen, Frank.....	St. Paul, Minn.
Bates, Harry Ellsworth.....	New Haven, Conn.
Brownell, Waldo Howland.....	New Bedford, Mass.
Brodhead, Lewis Jacob.....	Stone Ridge, N. Y.
Buckner, George William.....	Liberty Centre, Ind.
Burnett, Theodore Addison.....	Springfield, Ohio.
Campbell, Edwin Taylor.....	Tarrytown, N. Y.
Campbell, Samuel Maurice.....	Pottstown, Pa.
Case, Josiah Corwin.....	Peconic, N. Y.
Cochran, Matthew Hallinan.....	New York, N. Y.
Doyle, William Francis.....	New York, N. Y.
Driscoll, Harry O.....	New Haven, Conn.
Ellis, Robert Walter.....	Paterson, N. J.
Fagan, Gulian Clement.....	New York, N. Y.
Farnum, William David.....	Waltham, Mass.
Greely, Frederick Doran.....	New Bedford, Mass.
Griffin, Gerald Edward.....	Fort Robinson, Neb.
Hall, Charles.....	Randolph, N. Y.
Hart, Walter Lawrence.....	Philadelphia, Pa.
Hanson, Harry Dennett.....	New York, N. Y.
Hausser, Herman.....	Jersey City, N. J.
Hooker, John.....	New Baltimore, Mich.
Huhne, John Augustus.....	Kingston, N. Y.

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Jamieson, Charles.....	Brooklyn, N. Y.
Jarman, George Allen.....	Chesterville, Md.
Joerg, Edward Fred'k Chas.....	Oleona, Pa.
Johnstone, James.....	Dobbs Ferry, N. Y.
Lee, John Thomas, M.D.....	Minneapolis, Minn.
Leis, Robert L.....	Newark, N. J.
Letts, Richard Runyon.....	Hoboken, N. J.
MacMurdo, Chas. Douglas.....	Charlottesville, Va.
Mellows, William Francis.....	Sing Sing, N. Y.
Morris, Harry.....	Providence, R. I.
Morrison, Richard Rundle.....	Sidney, Australia.
Nicolas, Nicolas Louis Jos.....	Sarreguemines, France.
O'Connor, Morice Edwin.....	Denver, Col.
Ogle, Joseph, Jr.....	New York, N. Y.
Partlan, Thomas Stephen.....	Rondout, N. Y.
Stanbrough, Clarence Peter.....	Newburgh, N. Y.
Summy, Harry Balmer.....	Manheim, Pa.
Martin, Joseph Tewey.....	Irvington, N. Y.
Thompson, Albert Joseph.....	Lebanon, Ohio.
Vanderveer, George Glover.....	Brooklyn, N. Y.

This ceremony being concluded, Professor Doremus stepped forward, and in his usual pleasant manner, announced that the time had come for the delivery of the prizes, and upon opening the various sealed envelopes containing the names of the fortunate competitors, the following were revealed:

For the prize of the Board of Trustees, viz.: A gold medal for the best general examination, Dr. Harry Dennett Hanson.

For the prize of the Faculty, a gold medal for the best practical examination before a committee selected from amongst the practitioners of New York city, Dr. Joseph Ogle, Jr.

For the Alumni Association prize, a set of standard veterinary books for the second best general examination, Dr. Gerald Edward Griffin.

For the anatomical prize, a case of instruments, for the best anatomical preparation, Dr. Richard Runyon Letts, and for the College Medical Association, a box of instruments for the best paper read and defended before the Association, the prize being

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offered by its President, Dr. George Glover Vanderveer.

The valedictory address followed by Dr. A. J. Thompson, of the graduating class. This was one of the best valedictory addresses ever pronounced by a young man before a similar audience, and the delivery was of corresponding excellence with the conception. The class was then addressed by Mr. T. G. Agar, whose remarks showed a careful study of the importance of veterinary science, and proved to be a very interesting feature of the exercises. The benediction pronounced by Dr. Duryea terminated the proceedings, which were of a character to give a high degree of satisfaction to all who were privileged to be either participants or spectators.

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## CORRESPONDENCE.

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### THE CALIFORNIA ASSOCIATION STATES HER CASE.

SAN JOSE, Feb. 8, 1889.

*Editor American Veterinary Review :*

SIR.—In the January number of your valuable journal I read with surprise and regret a communication criticising the editor for a kindly notice of the "California State Veterinary Medical Association," and also criticising the organization itself. As a member of that Association, and being one of the particular members designated in the article as non-professional, perhaps it would not be out of place to offer some defense, and explanation of how the society came to have an existence.

Something near a year ago, two or three veterinarians, all M. R.C.V.Ss, in San Francisco, conceived the idea that an Association of some kind would be of value to the members of the profession in this State, and through the newspapers called a meeting for the purpose of forming a veterinary society, having for its object the promotion of fraternal feeling and advancement of the profession; very few responded to the call, five graduates, I

think, and two non-graduates. The meeting was called to order, and a discussion took place among the graduates as to the feasibility of admitting members without diplomas, in which discussion the non-graduates did not participate. Finally a unanimous verdict was rendered, that there were persons, who from long experience and education, were entitled to recognition, and one of the arguments advanced was that many of these gentlemen had been actively engaged in practice here, when the regular graduate was almost unknown in the State, and had thus, in educating the people to a knowledge of the usefulness of the profession, paved the way for their more advanced brethren. It was, therefore, resolved that when such persons could substantiate an intelligent knowledge of the profession, by a fair, square, theoretical and practical examination, before a board of three graduated professionals, they should be entitled to membership. Now, on that basis there has been five admitted, and numbers rejected. Of the fortunate five, your humble servant is one.

The organization now numbers about a score ; at the second meeting seven new members were admitted, all graduates, and all but one expressed their satisfaction with the opinion their professional brothers had taken with regard to empirics ; this one finally accepted the conditions, and was made one of the officers, and then all the trouble the young society has known commenced. It was desirable that the Association should have a legal standing, and the Secretary volunteered to assume the responsibility of securing its incorporation under the State laws, before the next quarterly meeting, at which time he also thought he would offer the name of his brother for membership, said brother being about to graduate from a certain college, but instead of doing as directed, he sent in his resignation at the next meeting.

And this, Mr. Editor, is the reason that the society had no legal standing (though it has since been incorporated). Meantime the brother arrived, and immediately commenced to try to destroy the Association, by writing to the graduated members, asking them to withdraw and join himself and brother in the formation of a society consisting only of graduated practitioners. Having

failed in this scheme, and receiving one or two sharp answers from those he addressed, he attacks the organization through the columns of the REVIEW.

And now, Mr. Editor, this talk about the Association providing no protection to the profession is idle, inasmuch as protection must come from State legislation, and the veterinary societies can only see that the law is enforced; until they have such law they are powerless.

In conclusion I wish to say that to accuse a Board of Examiners composed of such men as Dr. J. P. Klench, graduate of Alfort, Dr. Thos. Bowhill, M.R.C.V.S., and Dr. Thos. Maclay, M. R.C.V.S., of admitting "all kinds of non-professionals" to comparative equality with themselves, is an insult alike to their intelligence, manhood and to their *alma mater*.

Yours truly,

H. A. SPENCER.

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BACK NUMBER WANTED.

688 Main St., CAMBRIDGEPORT, MASS., }  
February 18, 1889. }

*Mr. Editor :*

Please say in your journal that I lack the April number of 1887, (No. 1), of the AMERICAN VETERINARY REVIEW to complete a volume. Any one having this number to dispose of will find a purchaser by addressing.

Yours truly,

CHAS. H. HALL.

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PRACTICE FOR SALE.

PEORIA, ILL., Feb. 20, 1889.

*Dear Editor :*

Please insert in your valuable journal, my veterinary practice for sale. I am located in a city of fifty thousand, with only one other graduate; also have the appointment of Assistant State Veterinarian which could be transferred to my successor. My reason for leaving is that I am retiring from the profession to

take up mercantile pursuits in the East. My practice pays me \$1,500 a year and no doubt could be made to pay more by a man who would be a hustler. As I am retiring for good, will dispose of office furniture, books, instruments, medicine rack and all that completes a veterinarian outfit. So hoping that the REVIEW will know of some one wanting a practice cheap in a wide-awake town, I will remain,

Yours, etc.,

WM. J. ELLIOTT.

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#### VETERINARIAN WANTED.

A good young graduate can have a good practice, hospital, instruments, etc., by applying to W: J. Smith, Genesco, Henry Co., Ill.

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### SOCIETY MEETINGS.

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#### THE ILLINOIS STATE VETERINARY MEDICAL ASSOCIATION.

The Illinois State Veterinary Medical Association held a special session of its semi-annual meeting at the Leland Hotel, Springfield, Friday, February 8th.

President Williams called the meeting to order at 11:35 A. M.

Twenty-three members responded to roll-call.

The reading of the minutes was laid over until the regular meeting.

Dr. F. Booker proposed the name of a Mr. Jno. Osborn, of Nokomis, for membership, but the applicant being a non-graduate, the Constitution would not permit of his election.

Dr. S. S. Baker proposed the name of Dr. L. A. Merrilat, Ont. '88, now in Chicago. On motion his election was made unanimous.

The principal object of the meeting was brought up next, and Dr. Casewell, chairman of the committee on legislation, presented the bill prepared for the present Legislature. On motion the Secretary was instructed to read the bill in sections, to be acted on separately by the Association.

Several modifications were thought expedient, and the amended bill returned to the committee with authority to make what trivial amendments were necessary to *insure* its passage.

Dr. Casewell named a competent man—a firm friend of the profession—to watch the bill at Springfield, and on motion the bill was placed in his hands.

A special assessment was made to defray the necessary expenses.

At 2 P. M. the Association adjourned for dinner.

At 3 o'clock the members assembled to listen to an able address by Professor G. E. Morrow, Dean of the Agricultural College, University of Illinois. He

dealt briefly but forcibly on the relations existing between the veterinary practitioner and agriculture—his duty to humanity, to the commonwealth, to himself.

A hearty vote of thanks was tendered the Professor on closing his remarks.

Papers were then presented as follows :

Tetanus, Dr. F. Booker, Carlinville; Arthritis in Foals, Dr. J. F. Reid, Decatur; and case reports as follows: Septicæmia after Castration, Dr. T. B. Newby, Shelbyville; and Strangulated Umbilical Hernia, Dr. Jno. Scott, Bloomington.

The discussions were unusually lively and beneficial.

After the proposal in due form of an amendment to the Constitution regarding admission of *associate* members from non-residents, the Association adjourned until the regular meeting at Chicago in June.

J. F. PEASE, D.V.S., *Recording Secretary*.

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### MARYLAND STATE VETERINARY MEDICAL SOCIETY.

The third annual meeting of the Society was held in Baltimore at the rooms of the U. S. Bureau of Animal Industry, Thursday evening, February 21st. Dr. William Dougherty, presiding.

The regular business of the Society adjusted, attention was given to the election of officers for the ensuing year, with the following results :

President, Dr. William H. Martenet; Vice President, Dr. William H. Wray; Secretary and Treasurer, Dr. E. C. Schroeder; Board of Censors, Dr. William Dougherty, Dr. T. F. Barron, Dr. J. F. Ryder, Dr. D. R. Hoffman, Dr. E. C. Schroeder.

Unanimous votes of thanks were offered the retiring officers for the faithful and efficient discharge of their duties, after which the Society went to Tierney's place on Calvert street to enjoy their annual banquet.

Characteristic of the evening were numerous toasts, followed by speeches from various prominent members.

Dr. William Dougherty, the outgoing President, made a strong and eloquent plea for the advancement and better enforcement of State sanitary laws. He related instances in his experience where he had found sanitary conditions, to say the least, highly deleterious to health, and then invited the gentlemen present to co-operate with him by the use of their personal influence and through the public press, in attempting to place thoroughly competent and conscientious men on the State sanitary staff.

F. W. Patterson, M. D., spoke of the prevalence of tuberculosis in our large cities, and of its sources when engendered in families naturally free from hereditary taint, naming, in this connection, meat and milk from tuberculous cows, and then outlining the necessity of milk and meat inspections, and, more particularly, the inspection of milk and meat producing animals. Further, he spoke of the relations between the human and veterinary medical professions, and their dependance on each other.

Dr. George C. Faville, Chief of the Bureau of Animal Industry in Maryland, related a series of facts concerning the use and sale of milk and meat from tuber-

culous cows, calling special attention to one case, a cow, the milk of which was sold during 18 months after tuberculosis had been diagnosed, and during a considerable period after she had been isolated from the dairy herd to which she belonged, with the apparent object to prevent the disease from spreading in the stable without sacrificing the profits to be derived from peddling the diseased milk. The same cow, after her flow of milk ceased, was slaughtered, and her meat sold in public market. Her lungs, filled with an excess of tubercles, were presented to the proper authorities, but no action could be taken because no laws oppose the introduction of bacterial poison into the systems of the men, women and children of the State.

Dr. William H. Wray, State Veterinarian, commented on the lack of legislation in matters essential to public health, and later on indicated the difference between New York and Baltimore analyses of milk, closing with a few words in reference to the good results attendant upon the suppression of swill feeding in dairy stables in New York.

Dr. L. F. Russell, of Maine, gave a short sketch of State Agricultural and Veterinary Experimental Stations and of their object and use.

The desirable flavor of merriment was inspired into the banquet through the wit and humor of Dr. C. K. Dyer and Mr. Fred. Faville.

E. C. SCHROEDER, M.D.V., *Secretary*.

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“The Gods give no great good without labor,” is an old proverb, and a true one; the hardest labor is not always that which is best paid, however. To those in search of light, pleasant and profitable employment, we say write to B. F. Johnson & Co., Richmond, Va.

# AMERICAN VETERINARY REVIEW,

MAY, 1889.

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## EDITORIAL.

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UNITED STATES VETERINARY MEDICAL ASSOCIATION.—Our relations—the objects of each—creating and sustaining a truly Americanized veterinary profession—the progress of American veterinary literature—the works and the efforts of the REVIEW—our hospitality—gathering of good material at the semi-annual meeting—The Massachusetts Veterinary Medical Association—Etiology of Tuberculosis by Koch, from the transactions of the Massachusetts Veterinary Medical Association—our publication of this valuable paper—also of the *comptes rendus* from Dr. Hoskins—also of other papers. POLITICAL GUILLOTINE ON VETERINARIANS.—One more convincing evidence of the progress of veterinary science in the United States—the veterinarian has had all he could wish—now the official guillotine works on him—his sudden collapse from official position to sad realization of political unimportance—it is not surprising to us—but why apply it to scientific specialists—Dr. Billing's resignation the result of political influence. SACRIFICED TO PROFESSIONAL DUTY.—Terribly sad news relating to Dr. P. Paquin—he is reported suffering with glanders—our hopes that we soon will have to report this as an error of diagnosis—our best wishes for his recovery. COMPLAINTS.—The REVIEW does not come regularly—who is at fault—a mean to correct the evil—let us try it.

UNITED STATES VETERINARY MEDICAL ASSOCIATION.—We have never failed to acknowledge our relation to the United States Veterinary Medical Association, and among the reasons by which we have been influenced in this, one has been the conviction, which we have always entertained, that the Association is to be regarded as the accepted representative of the profession in the United States, and whatever may be their course, and whatever the labors and transactions might be in which they may be engaged, the intent and the result will always prove the

identification of the organization with the interests, the progress and the improvement and elevation of American veterinary science.

We have sometimes, of course, found occasion to animadvert upon some of the proceedings and positions of the Association, and have at times criticised them quite sharply for an apparent lethargy of movement. But if we have been guilty in this respect, we have, on the other hand, never neglected the opportunities which have presented themselves to do them justice, and to work with them harmoniously for the same common object, viz : *Creating and sustaining a truly Americanized veterinary profession*, in whatever comprehensive national sense the phrase may be interpreted. The progress of American veterinary literature has probably been more laggard than that of any of the departments or interests pertaining to our peculiar guild, although the importance of a thorough cultivation of this department of our science is too obvious to call for argument or illustration. If for example, the essays, clinical reports and other professional papers of, say the last score of years, were collected and collated, how poor a show would it all make ! The REVIEW, within its limited sphere, labors to the extent of its power to bring about and maintain a better state of things in this respect, and we are always glad to take advantage of the occasions which are offered by the meetings of such of our veterinary societies as can be reached and made available in this behalf. One and all, moreover, the army of private veterinary practitioners of the country, are made more than welcome to our columns whenever they may choose to communicate in public with their brethren, upon any subject of genuine and general interest to the professional community. Our readers can judge for themselves as to the extent to which the hospitality of our columns has been thus far accepted.

The semi-annual meeting of the National Association which occurred in March last, proved to be one amongst many of the richest we ever attended, in the material of its composition and the value of its results, and the pleasure experienced by us on that very agreeable trip is one of the reminiscences with which our memory will not lightly part. We were fortunate enough

on this occasion to obtain from the Massachusetts Veterinary Medical Association the manuscript of the translation of that most excellent work of the great German pathologist, Koch, on the *Ætiology of Tuberculosis*, and our readers will be glad to know that we intend in the present and two following numbers of the REVIEW to publish the entire work. Our warm acknowledgments are due for the kindness of Dr. Winchester and the Massachusetts Association for thus enabling the REVIEW to present to its readers the first and only English translation of the most complete work on this important subject. The opportunity is one which should be fully appreciated, and of which we hope our friends will readily take advantage. Besides this, our present number will give the *compte rendus* which Dr. Hoskins had kindly forwarded to us, but which failed to come into our hands in time for our April number. In addition to these, two other of the papers which were read at the March meeting will be found in our present issue.

POLITICAL GUILLOTINE ON VETERINARIANS.—Among the most convincing of the evidences which tend to prove the diffusion of a better knowledge and higher appreciation of the importance which has been acquired by the cause of veterinary science in the past five or six years, there is, in our estimation, (as an observer of foreign birth), none so prominent and conclusive as that which offers itself in the recent changes which have either occurred already or are destined to be accomplished in the establishment of a recognized official position for members of the veterinary profession. It is indeed a fact, that there is at length an established relation between politics and veterinary medicine, and what can the veterinarian of to-day ask now? Yes, the veterinarian has become subject to specific laws for the regulation of his profession; he has State legislation to protect his name and his title; State appropriations for veterinary purposes, with State and city appointments of official scientists to carry them into effect, and the civil service law has interposed and offered him its sanctions and precautions and means of advancement and of promotion. Is it then surprising that, like all other official appointees, he should now be exposed to the same official

guillotine, and share with other officials the common and universal liability to discover some day that he has suffered the process of capillary amputation? To-day he may be a meat inspector, a city Board of Health appointee, a State veterinarian, a chief or a simple officer of the Bureau of Animal Industry, but sometime an election has been held and he walks forth with his official head in his hand. He has been guillotined, and only his private personal caput as a veterinarian remains on his shoulders to illustrate and comprehend the chances of official life. He has leisure now to search for the reason of this sudden revolution in his condition, but the only discovery that rewards his reflections is that his professional claims and abilities were not strong enough to overcome the political "pull" of some other man whose "services at the primaries" have been of more value than his to the man who has been elected.

Well, after all there is nothing very peculiar about this—it is "politics" merely—we had no right to expect things to be otherwise; we did, personally, know of it, but we never dreamed it would go quite so far as it seems to have been carried in some quarters, and certainly we never had entertained the idea that professorships could be cast aside, and competent and hard-working public servants compelled to resign their positions after accomplishing large labors for the common good, and all through the operation of political influence.

We certainly cannot pass over the resignation of Professor Billings, of the University of Nebraska, which, if we are correctly informed, was brought on through the stress of political motion, without a word of protest and without regretting our modest position in a post where no "*exécuteur des hautes œuvres*" could be found to deprive us or any of our confreres of our heads, solely because of political power or as a punishment for a difference in political opinion. In our capacity of veterinarians, it seems to us to be a matter of little importance whether we are known as a member of one party or another, or whether the Democratic or Republican platform best expresses our political sentiments. Let the men who do their work well and to the best of their ability be respected for their works' sake, without impertinent interfer-

ence, so long as they contribute their aid to the common great object of working in behalf of the animal wealth of our country.

SACRIFICED TO PROFESSIONAL DUTY.—An item of news of a most afflictive kind has reached us, which, though we reluctantly record it, we cannot avoid hoping most sincerely may prove to have been exaggerated beyond the fact, and that we may soon have the satisfaction of correcting it. It is to the effect that Dr. Paul Paquin, the young State Veterinarian of Missouri, and who has for some time been making himself favorably known to his professional brethren by his scientific work, and a series of interesting investigations, has written to inform us that he has been attacked with an illness of the most alarming kind, and that he himself, as well as his physician in attendance, have been compelled to admit the conviction that he is doomed to close his mortal career as a victim to the fatal infection of glanders. The doctor, who, we believe, has moved for treatment to the Hot Springs of Arkansas, seems to be nearly certain of his diagnosis, and that, to us who know the prognosis in such a case, has a fearful meaning. Let us hope that in the account which we have received, we may be justified in ignoring the process of inoculation ascribed as the cause of the blood poisoning, and that we may at an early date be authorized to announce that the veterinary profession is not yet to be called to lament the death of our young compeer as a martyr to his professional duties.

COMPLAINTS.—We have received several letters complaining bitterly of the irregular delivery of the REVIEW. We have in all cases carefully inquired into the causes of the irregularity, and of course, as usual in similar cases, have failed to discover the true cause. We are not to blame ourselves, of course, nor are the post-office agents! "Can we remedy the evil?" is the question. We believe that if our friends, one and all, would write plainly on a postal card, their full name, full address, street and number, and when possible, post-office number when there is one, a great deal of this trouble would be avoided. Let us try it.

## ÆTIOLOGY OF TUBERCULOSIS.

By DR. R. KOCH, Privy Councillor.

(Translated by Rev. F. SAUSE.)

(*Transactions of the Massachusetts Veterinary Medical Association.*)

A series of investigations of the Ætiology of Tuberculosis which I have been making within the last few years have led me to results which were first reported before the Physiological Society of Berlin, March 24th, 1882 (*Berliner klinische Wochenschrift*, 1882, No. 15). My communications at that time, however, could only embrace the most important points, while the more minute description of the attempts was necessarily reserved for a detailed report. Since then, by continued investigations, many gaps have been filled and new matter added. The report of my labors in the investigation of the ætiology of tuberculosis, completed and enlarged by these researches, is given in the following.

The question whether tuberculosis is a disease dependent upon transmitted disease-germs can be approached in different ways, as this has in fact been done. It has been attempted to secure certainty, partly with the aid of clinical observations, partly by means of anatomical and also by experimental investigations. Most uncertain are the results of the experience gathered at the sickbed. It is true, cases occur in the experience of every physician with fair practice, in which he cannot fail to see a transmission of tuberculosis from one person to another. Then, however, follow numerous cases in which every possibility of infection seems to be excluded. Attempts have been made repeatedly to prove the contagious nature of phthisis, but they must be looked upon as failures, as such views have never found acceptance among scientists. Some clinical authorities, to be sure, have not lost view of the possibility of contagion, but on the whole physicians consider phthisis a non-contagious disease, proceeding from constitutional anomalies. An indication of the infectious character of tuberculosis, which cannot be ignored, was given by pathological anatomy, when Buhl called attention to the connection of miliary tuberculosis with käse-herden,\* (a German technical term of which I do not know the meaning in the English language) and offered the proposition that general tuberculosis is to be looked upon as a disease which is brought about by the resorption of a virus present in the primary käse-herd (cheesy-nodule), hence as it were, by auto-infection. As to the manner in which tuberculous virus spreads itself through the body, the discoveries of Ponfick in regard to the thoracic duct and of Weigert in regard to veinous tubercles in miliary tuberculosis have given light. However, these facts only prove the spread of tuberculous virus in the body itself, without proving the transmission from one individual to another, in which latter the contagious nature really consists. With this last question experimental pathology has occupied itself in the most searching manner. The course taken in experimental investigations of the infectious nature of tuberculosis has been described of late very minutely, (cf, Johne, *Die Geschichte der Tuberculose*. Leipzig, 1883), so that I can omit the historical details and confine myself to a few remarks on the more important heads.

\*Cheesy nodules.—S.

Solitary, incomplete and negative attempts to generate tuberculosis artificially were made towards the end of the last century. The first successful attempts were made by Klencke, who by inoculation of miliary and infiltrated tubercles from the human being into the cervical veins of rabbits, brought about a widespread tuberculosis of the lungs and liver. Klencke must therefore be pronounced the discoverer of experimental tuberculosis. He did not continue his attempts, and so they were almost forgotten. In a systematic and thorough manner experimental tuberculosis was worked out by Villemin. He not only inoculated tuberculous substances from the human subject, but also from the pearl disease of cattle, and showed by experiment the identity of pearl disease and tuberculosis. Villemin's investigations seemed already, by the number of experiments, by their careful execution and comparison with opposing attempts bearing upon the same question, to have decided the question in favor of the infection theory. Nevertheless the numerous investigators who repeated Villemin's attempts according to the methods suggested by him or in modified ways, arrived at very contradictory results. The defenders of the infection theory, especially Klebs, sought to improve the experimental technique and to free it from the errors clinging to it; the opponents, on the contrary, strove to prove that the tuberculous substance possessed no virulent properties, and true tuberculosis could be produced by inoculation with material in which tuberculosis did not exist. This dispute was first settled by the experiments of Cohnheim and Salomonsen who, with this end in view, inoculated the anterior chamber of the eyes of rabbits. It was an exceedingly happy idea to make use of the rabbit eye as the place of inoculation. From the nature of the case, those cases in which tuberculous substance only has been inoculated must be distinguished from those in which other infectious material has been combined with the tuberculous virus. In subcutaneous inoculation, such materials often produce more or less widespread caseous infiltrations, which are not unlike the tuberculous cheesy products. In the eye, on the contrary, they cause an inflammation which rapidly runs its course, which can in no case be mistaken for the inoculated tuberculosis, which is slow and unique in its development. This inoculated tuberculosis, when the experiment is successful, takes such a course that it is always manifest to the investigator. After a somewhat prolonged stage of incubation little gray nodules appear in the iris, scarcely visible to the naked eye and proceeding from the transplanted portions of tuberculous substance. The number of these nodules increases gradually, they themselves grow, become yellowish in the center, become cheesy and show as well macroscopically as microscopically all the typical characteristics of genuine tuberculous nodules.

Tuberculous infection is, moreover, not confined to the eye, but spreads itself later through the entire organism; it attacks especially the neighboring lymphatic glands, the lungs, spleen, liver and kidneys. According to the united testimony of Cohnheim and Salomonsen and all other experimenters, who have repeated these attempts, an iris-tuberculosis has in no case followed the inoculation with non-tuberculous substances. More than this, a spontaneous case of iris-tuberculosis in rabbits has never been observed. This method of infection is therefore superior to all others in so far as that the influence of unintentional errors in attempt is shut out, errors which so easily creep into the experiments in subcutaneous inoculation and in transplantation into the abdominal cavity. The chance of

mistaking artificial tuberculosis for that arising spontaneously is also completely excluded. Therefore in comparing the attempts of Cohnheim and Salomonsen with those previously made, they must be admitted to be completely free from objection, and by them it is proved that the most different tuberculous substances contain a specific and individual element.

Of what character this infectious matter might be, whether it be formed by means of organisms independent, or provided with unvarying properties, which force themselves into the body as parasites and communicate tuberculosis to it, or whether the infectious material exists only in certain conditions of the body and consists of organized or unorganized formations arising from its own ingredients, was a question that for the time being could not be decided. But after the results, which have been attained of late years regarding the ætiology of many infectious diseases, the possibility that also the cause of tuberculosis was to be sought in some sort of micro-organisms, seems to be indicated. In order to obtain light on this point, it was necessary to make use of all that experience which had proved itself useful in the examination of other infectious diseases, and the same course of investigation was to be chosen which in other cases had shown itself most to the purpose. To make the best use of these advantages, the attempts were to be made in the following manner: In the first place, it must be decided whether form elements, not belonging to the elements of the body, or arising from them, are present in the diseased parts. If the existence of such can be proved, then we must investigate whether the same be organized and whether they offer any signs of independent life, among which independent motion, (for which molecular motion is very often mistaken), growth, increase and generation are to be reckoned. Further, the relations to their surroundings, the conduct of the components of the neighboring textures, their diffusion in the body, their appearance at the various stages of the disease, and other circumstances must be traced, which, with more or less probability, show a primary connection between these formations and the disease. It is possible that the facts gained in this manner may afford such proof that only the most extreme scepticism can maintain that micro-organisms found are no cause, but only an accompaniment of the disease. Often, of course, this objection is justified, and therefore it is necessary for a complete system of proof that one should not confine himself to showing the co-existence of the disease and parasites, but that, more than this, these parasites must be shown to be the real cause of the disease. This can only be done by removing the parasites from the diseased organism completely, and freeing them from all products of the disease to which a hurtful influence could be ascribed, and that by the introduction of the isolated parasites into the healthy organism, the disease with all its peculiar characteristics should be produced anew. An example may serve to explain what has just been said. If the blood of animals which have died from inflammation of the spleen be examined, there are always found therein numerous minute, rod-shaped, colorless, motionless forms. One could not see immediately that these minute rods are of a vegetable nature, and indeed in the beginning they were often held for lifeless crystalline bodies. First from the circumstance that they were seen to grow from spores, and that from the spores little rods were developed anew, could it be decided with certainty that they possessed life and belonged to the lowest class of plants. Further,

when the very smallest amount of the blood of an animal dying of inflammation of the spleen is inoculated into another animal, said animal invariably dies of the same disease, and it also contains the little rods, the so-called "bacilli" of inflammation of the spleen. This does not prove, however, that by the inoculation of the little wands, the disease was communicated. In order to know whether the bacilli, and not other components of the blood of inflammation of the spleen, produces said inflammation, the bacilli must be separated from the blood, and be inoculated alone.

The isolation of the bacilli can be ascertained with most certainty by continued cultivation apart from all other things. To this end, a small quantity of blood containing bacilli is placed upon some fixed nutrient soil, on which the bacilli are able to grow, for instance, nutrient gelatine or boiled potatoes. Here they soon begin to increase very rapidly, while the other components of the blood, corpuscles and serum, remain unchanged. After two or three days, when the bacilli have formed a dense mass of spore-holding threads, the smallest possible of the no longer blood-red, but whitish looking mass, is taken and again placed upon nutrient gelatine or boiled potatoes. The bacilli increase in exactly the same manner as in the first planting, and form a dense white mass on the potato, and already in this second transplanting the most careful examination with the microscope will scarcely show any traces of the other components of the blood. In like manner the continued transplanting is carried on. After the third or fourth, the bacilli may be considered free from all other parts of the blood, which at first were planted with them. If the transplantations now are repeated twenty or fifty times, or still oftener, then it may be concluded with all imaginable certainty, that not the least taint of the disease clings to the bacilli. Even internally they could hide nothing of that kind; for the finest planted bacilli are also no longer present, and their descendants for many generations have obtained the necessary material for their growth from their fostering soil, the potato. The pure breed obtained in this way has no connection with the diseased organism from whose blood the first planting came, and with the products of disease, which belong to animal metamorphosis. Nevertheless, as soon as they are inoculated into a healthy animal, they produce the fatal disease. The inoculated animal sickens as quickly and with the same symptoms as if it had been inoculated with blood fresh from a diseased animal, or had spontaneously become diseased with inflammation of the spleen, and in its blood appear the same innumerable bacilli as in the natural disease, which have the same properties as the well known bacilli of inflammation of the spleen. In view of these facts, there is no other explanation, than that said bacilli are not an accompaniment of inflammation of the spleen, but the real cause of this disease. Now inflammation of the spleen does not always present the same clinical appearance; its form varies in the different species of animals; in the case of man it can run its course with the symptoms of a general infection, without prominent local disturbances, or it can remain purely local and confine itself to a certain point on the outer skin, on the gut, or on the larynx. Nevertheless also in these cases, if the characteristic bacilli are found in the diseased places, we must consider them as the cause of the disease; for their disease-producing qualities are known to us, and we cannot very well imagine that in the tissues of the same organism the

bacilli are at one time harmless, at another time disease-producing parasites. These conclusions are so indisputable that probably nobody questions them, and that in science the bacilli of inflammation of the spleen are considered the cause as well of the usual typical disease as appearing in our domestic animals, as also of the clinically varying type which appears in man.

The course just sketched, which those who strove to prove the parasitic nature of inflammation of the spleen have taken with success, and the conclusions necessarily obtained from the results, I have placed at the foundation of my investigation of the ætiology of tuberculosis. These had to employ themselves in the first place with the proof of disease-producing organisms, then with their isolation, then with their inoculation. I now go over to the description of these single divisions of the investigation.

I.—*Proof of the presence of disease-producing organisms in the organs changed by tuberculosis and in the separation of the latter.*

Disease-producing organisms, which have the size of inflammation-of-the-spleen bacilli and like these, appear in the blood in large numbers, or those which, like the “*nekurrensperochaeten*” attract the eye, offer no especial difficulties in investigation, and the proof of such micro-organisms can be obtained by ordinary optical helps. The case is different, however, when it is necessary to prove the existence of minute bacteria present in the tissues in only small numbers, especially when cells are heaped up or broken down in the spots concerned, which is almost always the case. Then it is necessary to use the more delicate technical helps of microscopy, as especial methods of preparation and differential coloring, and to pursue the investigations with the best optical apparatus, oil-immersion systems and Abbe’s illuminating apparatus.

Also in regard to tuberculosis it was to be expected that to show that special disease-producing organisms do actually exist, might offer special difficulties, as they had already been much sought for, and nothing found that could give confidence in their existence. I began investigations with material in which infectious matter might be expected with certainty, for instance, in freshly developed and still grey tubercles from the lungs of animals which had been killed three or four weeks after inoculation. From these lungs, hardened in alcohol, sections were made and examined according to the most approved methods for proving the existence of bacteria. Grey tubercles were also crushed, spread out on glass covers, dried, and then examined with reference to the existence of micro-organisms. All attempts to find bacteria or other micro-organisms in these prepared specimens proved unsuccessful. In former experiments it had been attempted to color the bacteria as strongly and as differently from the surrounding tissue as possible, and in such attempts it had been proved that in certain cases the addition of alkalis to the color-solutions offered essential advantages; therefore this treatment was adopted. Of the usual aniline color the methylene blue will bear the greatest addition of alkali, on which account this coloring material was chosen, and just so much potash-lye was added to a watery solution of the same as to form no precipitate, and that the liquid remained clear. For the preparation of this mixture 1 ccm. of a concentrated alcoholic methylene-blue solution and 200 ccm. of distilled water were mixed, well shaken and during repeated shaking 0.2 ccm. of 10 proc. potash-lye was added. When glass-covered prepara-

tions had been treated twenty-four hours with this color solution, there appeared in the tuberculous mass very fine staff-shaped forms, which, as further investigation proved, had the power of increasing and forming spores, and therefore belong to the same group of organisms as the inflammation-of-the-spleen bacilli. In section preparations it was incomparably more difficult to recognize these bacilli among the thickly heaped grains and masses of detritus, and it was therefore attempted, following the example of Weigert, who, succeeding in the coloring of the inflammation-of-the-spleen bacilli a different color from the surrounding tissues, to make the tuberculous bacilli more plainly visible, by similar differentiating color reaction. This end was reached by the use of a concentrated watery solution of vesuvian, with which the blue colored, covered glass preparations and section preparations were treated so long, till to the naked eye, it seemed colored brown. Under microscopic examination it was then seen that only the previously blue-colored cell grains and the products of their disorganization had taken the brown color, but that the tuberculous bacilli remained a beautiful blue color, and, in consequence of this were very plainly to be distinguished from their surroundings, so that even in the masses of grains, thickly heaped together, they were easily recognized. In the use of methylene blue in the manner just described, the bacilli, however, do not take a very intense color, and it requires a certain amount of practice to be able to prove their existence everywhere in tuberculous objects.

Another method which gives to the bacilli a very strong color, we owe to Ehrlich. I use the same now exclusively, and earnestly recommend it to all who are beginning their studies of tuberculous bacilli. Ehrlich's method has since received many unimportant modifications, partly improvements. Among the latter I would reckon the proportions of solutions as settled by Weigert and the shortening of the color solution, a change recommended by Rindfleisch. If I describe the method in which I use Ehrlich's treatment as exactly as possible, I am nevertheless not of the opinion that the modification which I have followed is the best, or that just as good results are not to be gained by other modifications of the treatment. But the coloring of the tuberculous bacilli appears still to offer difficulties to many investigators, and for this reason, it will certainly not seem superfluous to give as exact directions as possible for the method of coloring.

In order to prepare the color solution, aniline water and saturated alcoholic solutions of methyl violet (to be distinguished from methylene blue) or fuchsine are necessary. The aniline water is prepared in the following manner: About 5 ccm. of pure aniline, an oil-like liquid, at first colorless, afterwards becoming brown, is poured into 100 ccm. of distilled water and this mixture is shaken repeatedly. From three to four per cent. of aniline dissolves in the water and the rest remains in the bottom of the dish in the form of thick drops. After a saturated solution of aniline in water has been formed in this way, which is the case after about half an hour, this aniline water is filtrated through a filter, which has been moistened in order to separate it from the rest of the undissolved aniline. The filtrate must be clear as water and colorless, and no little drops of aniline must be suspended in it. If such have passed the filter, the liquid must be filtrated again.

One obtains the second ingredience of the color solution, the saturated solution of methyl violet, by taking not too small a quantity (20 grm.) of dry methyl

violet in a well closing glass vessel, pouring over it 100–150 ccm. of absolute alcohol and shaking it repeatedly. After standing a day, there must still be undissolved methyl violet at the bottom of the vessel, which of course can also be dissolved and made use of by gradually pouring on more alcohol. When in place of methyl violet, fuchsine is used, which seems to offer certain advantages for permanent preparations, one also proceeds in the just described manner.

After this, the alcoholic methyl violet solution and the aniline water are to be mixed, and according to Weigert in the proportion of 100 ccm. aniline water to 11 ccm. methyl violet solution. I add to this mixture 10 ccm. of absolute alcohol, because I have found that then the color solution remains usable in a well closed glass for about ten days and does not need to be filtered each time before using.

The preparations which are to be examined with reference to tuberculous bacilli are to be prepared in the following manner: Covering glasses are to be freed from fat and all other extraneous matter, which might prevent adhesion of the substance to be examined, by washing in nitric acid and cleaning with alcohol. The substance is then to be spread out on the covering glass in as thin a section as possible. This procedure succeeds best when soft caseous masses are treated; they can be spread out evenly and thin with a scalpel or a needle. Firmer, crumbly caseous masses must be carefully crushed with the scalpel and arranged on the glass by spreading out repeatedly. Still more difficult is it to prepare a little tuberculous knot, which possesses a compact consistence. It must be completely crushed and pressed to pieces on the covering glass. The preparation of covering glasses with sputum also demands a special technique. One must not content himself with taking any chance list of mucus from the sputum, since the sputum consists not only of the secretion of the diseased parts of the lungs, but also of bronchial secretion and mucus from the mouth and nose. It is on this account necessary to examine only those parts of the sputum which have separated themselves from the diseased lungs, that is to say, the yellowish lumps which often swim solitarily in the frothy slimy liquid, which to be sure often forms the greatest part of the sputum. Such a lump of this yellowish, extremely tough mass should be drawn to the edge of the glass, then a little bit of it separated with the scalpel, drawn out of the liquid and on to the inner wall of the glass. Here it can easily be further divided, and be taken off in as large particles as one wishes to transfer to the covering glass. On this it is spread out very evenly and thinly, and any residue should be brought to a corner of the covering glass, and from there removed with blotting paper.

After the covering glass has been prepared in this manner, the section spread out upon it must be allowed to become thoroughly dry. Not until this is the case can the covering glass be heated temporarily, in order to make the section insoluble in watery fluids, with which it is now brought in contact. The covering glass can be put into a drying box heated to 110° for twenty minutes, or one can hold the covering glass with a pincette, and draw it several times, not too quickly, through a gas or spirit flame. The prepared section of the covering glass is during this process to be on the upper side and is not directly touched by the flame. That the forms of the bacteria cells, etc., which occur in the section are not changed in the least by this careful process, can be shown by the following ex-

periment. Of several covering glasses, provided with a dried on section, let the first not be heated at all, the second drawn once through the flame, the third twice, etc. When after this the covering glasses are treated with color solutions, it appears that the coloring of the cell grains and bacteria shows no difference between the one not heated at all and those drawn through the flame from one to four times. Also the forms remain unchanged. If the heating is carried farther and the covering glasses oftener drawn through the flame, the bacteria gradually lose the power of taking the coloring material, while the cell grains become colored even after very intense heating. In the covering glasses which have not been heated the section separates itself more or less, often entirely, also the dissolving "eiweisskörper" (white-of-egg bodies) form with the coloring matter precipitates, which cover the section and make the recognition of bacteria very difficult and even impossible. Better results are given by the covering glasses which have been once or twice drawn through the flame, but those drawn through three times give the best. One of these last the section clings uniformly, the "eiweisskörper" are insoluble or so nearly so that no more precipitates are formed, also the bacteria and cell grains take the color, with an even degree of intensity, while the surrounding substance remains wholly or almost wholly uncolored. On this account I always proceed thus: After the sections spread out on the covering glasses have become completely dry, which always takes place in a few minutes, I draw them three times with moderate quickness through a Bunsen burner. The color-solution is placed in a watch glass or a flat vessel, and after the heating the covering glass is laid face downward on the liquid, that it swims. One must be careful that there are no air bubbles under the glass, as otherwise the section would not be wet in these places and therefore not colored. Then let the color-solution be so far heated that it just begins to bubble, and after once boiling leave the coloring glass upon it about ten minutes; the result will be a sufficiently powerful coloring. Better results are nevertheless reached when the covering glass swims for several hours on the unheated solution. In all difficult cases, when one wishes to prove the existence of single bacilli, it is well to leave the covering glass twelve hours or longer in the color-solution.

When one wishes to examine sections of tissues with reference to tuberculous bacilli, pieces of the organ in question, not too large, are to be well hardened in absolute alcohol. Other hardening processes make difficult or even hinder the coloring of the bacilli. The sections need not be very thin, because by means of the double coloring, single bacilli can be distinguished very easily even in quite thick sections. Nevertheless, it is more to the purpose to prepare large sections, since the distribution of the bacilli is often very irregular, therefore it is possible that in small sections no bacilli may be found. The use of the microtome in the preparation of the sections is for this reason almost invaluable. The sections are immediately laid into the color-solution and remain in the same at least twelve hours. They can remain in it several days without injury.

The sections as well as the layer clinging to the covering glass have, when taken out of the color-solution after the given time, a dark blue, almost black-blue color. In this condition all parts of the tissue are almost evenly dark colored, and it is scarcely possible to recognize the coarser structures. In order to make the preparation suitable for microscopic investigation, a great part of the coloring

material must be removed again. This can be done in various ways. In the method originally used by me, of coloring with alkaline methylene-blue solution, I had found that the blue coloring of the constituent parts of the tissue could be driven out by treating with a solution of vesuvian. The same can be carried out in the preparations which are colored according to Ehrlich's method. When these preparations are rinsed off in water and then put into a concentrated watery solution of vesuvian, moved back and forth in the same, and finally put into alcohol, one succeeds in almost completely drawing out the dark blue coloring. The preparations, nevertheless, lose their color more quickly and completely by Ehrlich's method of treating them with nitric acid. That this can be done by other aniline coloring materials, as for example the above mentioned vesuvian, I have mentioned only for the reason that by many the effect of nitric acid has been erroneously held for something specific, but this is not the case, since other acids work similarly.

For taking the color out of the preparations, nitric acid, which has been diluted with two parts of water, is commonly used. So strong a concentration of the acid is nevertheless not absolutely necessary, and of late I use acid diluted with from three to four parts of water. Perhaps one can go even farther in the dilution. One should take care, however, that the nitric acid is free from nitrous acid.

When I spoke of the uncoloring of preparations by means of nitric acid, I followed the description which Ehrlich gave of his process. By the treatment of the covering-glass preparations with nitric acid, this term is exact, when the preparations are not intensely colored; after a stronger coloring, which gives decidedly better and more reliable results, the nitric acid after a few minutes fails to take all color from the dyed section, and section preparations, which, as it has already been carefully shown, must be colored a longer time and very intensely, always keep, after the nitric acid treatment, quite a dark coloring. The expression "uncolor" is not to be understood literally. The failure of bacilli-coloring appears in most cases to have had its foundation in this very thing. The experimenters thought that the preparations after treatment with nitric acid must be wholly colorless, and in order to reach this, partly colored too little the preparations, and partly left them too long in the acid.

When section preparations have lain in the solution twelve hours, and are then put into nitric acid, they lose their black-blue color in a few seconds and take a greenish-blue appearance. If they are then put into distilled water, the tone of the color changes directly. It becomes again noticeably darker and changes into blue, with a bit of violet. The nitric acid, therefore, has left a coloring matter in the preparation, which is insoluble in water, and in connection with water takes a darker tone. That this remainder of coloring matter is not easily soluble, even in nitric acid, can be easily shown. If the section be again dipped into the acid, their color will again become greenish-blue, but not paler than in the first treatment with the acid, and if washed again with water, they will again take the former dark coloring. I conclude from this that a longer remaining of the preparations in the acid is of no value for their further uncoloring, and leave them therefore, only a few seconds, at the highest half a minute in the same. On the contrary, I have found that the coloring matter in the preparations remain-

ing unaffected by nitric acid, is soluble in alcohol from sixty to seventy per cent. if the preparations are put immediately from the acid into the alcohol. A longer remaining of the preparations in alcohol appears to make the coloring matter finally insoluble also for alcohol, and it is therefore to the purpose not to wash the preparations in water after their treatment with nitric acid, but to place them directly into the alcohol.

The method of uncoloring followed by me is as follows: By the help of a platinum wire, which is melted into a little glass staff, the preparations are lifted out of the color-solution and laid into nitric acid diluted with three to four parts of water. In this they are moved back and forth for some seconds, until they have taken a greenish blue color, and are then put directly into a vessel with 60 per cent. alcohol. In the alcohol they remain only about ten to fifteen minutes, after which they receive the after-coloring now to be described.

In preparations treated with nitric acid and alcohol the component parts of the tissue are wholly colorless, or possess only a slight bluish tone of color, while the tuberculous bacilli have retained an intense blue color. Relative positions of the bacilli to their surroundings, are, owing to the nature of the preparations, difficult of proof. It is also very difficult to find single bacilli in the tissue, whose structure is made as good as completely invisible by the peculiar method of illumination, which will be described later, and for this cause it is necessary to give to the tissues a coloring of the nucleus. In order to obtain as striking a contrast as possible, between the coloring of the bacilli and the cell-grains, a yellow or light brown is chosen for the supplementary coloring material, when the bacilli are blue; a green or blue is chosen when they are red. For the first case vesuvian is best adapted, for the second methylene blue. Both coloring materials must nevertheless be used only in weak solutions, and not for too long a time, in order that just sufficient coloring of the grains may be obtained, lest single bacilli be hidden by too darkly dyed masses of grains. I use for the second coloring a watery, freshly filtered vesuvian-solution, which to a depth of 2 ccm. is just barely transparent. On this the uncolored covering-glass preparations are so laid that they float with the prepared section downwards. Section preparations remain in it some minutes. It is not necessary that the section preparations, when they are brought from the alcohol into the vesuvian solution, should be completely colorless, because they must later be again treated with alcohol, in order to get rid of the water in them, and will then lose whatever blue coloring matter will have remained.

One takes the preparations out of the vesuvian solution and puts them again into ten per cent alcohol and out of this into absolute alcohol. The further treatment is the familiar one, only it is to be recommended that for brightening the preparation, instead of oil of cloves, oil of turpentine, or still better, cedar-oil be used, as these do not draw the aniline out of the preparations. With reference to enclosing them with Canada balsam, I would say that a balsam diluted with oil of turpentine appears to be the best adapted. Very thick balsam, which must be warmed in order to enclose the preparation, must not be used, because in warming, the tuberculous bacilli usually lose their color quickly.

Covering glass preparations can be examined immediately after the washing off of the vesuvian solution with water, or they can be dried again and enclosed

in Canada balsam. For the examination of the sputum with reference to tuberculous bacilli, the second coloring can as a rule be omitted, so that the microscopic examination of such sputum preparation follows immediately upon the treatment of the same with nitric acid and alcohol.

For the sake of a general view, I will recapitulate briefly the whole coloring process: covering glass preparations dried in the thinnest possible section, after the drying, three times heated in the flame; section preparations of objects, which are well hardened in alcohol; coloring of a solution consisting of 100 ccm. of aniline water, 11 ccm. of alcoholic methyl violet solution or fuchsine, 10 ccm. of absolute alcohol; the preparations remain in the color solution at least twelve hours (the coloring of the covering glasses can be shortened by warming of the solution); treatment of the preparations with diluted (1:3) nitric acid for some seconds; washing in 60 per cent. alcohol for several minutes; (for covering glasses, moving back and forth in alcohol several times is sufficient); second coloring in diluted vesuvian solution or methylene blue for several minutes; washing again in 60 per cent. alcohol, getting rid of water by means of absolute alcohol, brightening in cedar oil; microscopic examination of the preparation; enclosing of the preparation in Canada balsam if the same is to be preserved.

As to the microscopic examination of the objects prepared in this manner, all that I have said in other works\* about objects colored for the microscope, holds true also for these. In this case also structural relations, which make themselves manifest by the varying refractive power of the single parts of the tissue, are not to be settled; it concerns us only to see the various color relations of the microscopic objects, that is to say, representations of absorption, as clearly and sharply as possible. The structural image whose effect is only disturbing must therefore be gotten rid of, which, as I have shown, can be done most completely with the help of the well-known illuminating apparatus of Abbe. The peculiar illumination which this apparatus affords when it is used without "abblendung," cannot be borne by all systems of lenses. The last must be constructed with special reference to this method of illumination. The greater an opening angle a system possesses, the better it is adapted for the observation of the images of absorption, with help of Abbe's illuminating apparatus. For this reason oil-immersion systems can accomplish the most in the investigation of colored objects.

The covering-glass preparations, if rightly prepared, must possess so little thickness that the structure is formed of a single layer of objects, and in and of itself is little to be considered. These preparations can on this account be examined simply in water and in case of need, a system of water-immersion is sufficient for them, if the field of vision be sufficiently brightened by a condenser. In the case of section-preparations, it is, on the contrary, impossible to set aside the structure formed by so many layers of tissue one above the other, unless the preparation is laid in a liquid which has high power of refraction. It is necessary to do away with the differences in refraction of the tissue, and to use the full illuminating power of Abbe's apparatus, and must use its full power to the best advantage through the large opening angle of an oil-system. One may easily con-

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\*Untersuchungen ueber die Aetiologie der Wundinfectiouskrankheiten. Leipzig 1878, p. 31, etc.

Mittheilungen aus dem Kaiserlichen Gesundheitsamte. 1881, Vol. 1, p. 9.

vince himself of the necessity of the optic helps here described as absolutely necessary, if one first examines a properly colored section in water and examines it microscopically by a dry system or a water-immersion system and a comparatively narrow "blendi" (blind or opening). Fine distinctions of color, and small colored bacteria in tissues, which are to any extent rich in grains, can under these conditions scarcely be distinguished. Also placing the section in glycerine changes almost nothing, because the differences in refraction of the parts of the tissue are equalized much too slowly and insufficiently. A noticeable improvement is gained by brightening the preparation by means of highly refractive liquids, such as oil of cloves, oil of cedar, etc.; for the brightening rests upon the more or less thorough destruction of the structure-image. But even this improvement is not sufficient to allow the color-pictures to appear in full clearness and sharpness. Only the quantity of light pouring in from all sides by means of Abbe's illuminating apparatus and the oil-system can fulfill this task. Who only cares to examine covering-glass preparations, without caring for complete certainty with regard to the state of things, for him a microscope with water-immersion system and without illuminating apparatus, will in case of need prove itself sufficient. Dry systems are not to be used for bacteria investigations. As soon as reliable investigations of finer bacteria are to be undertaken, or if one wishes to gain an independent judgment as to the newer results of bacteria research, it is absolutely necessary to have at hand the very best optic helps, that is to say oil-immersion systems and Abbe's illuminating apparatus. With regard to the magnifying powers which must be used for the examination of tuberculous bacilli, I will remark that 500-700 fold magnifying power is most to the purpose, and that this is best reached with an oil system  $\frac{1}{1\frac{1}{2}}$  of an inch and the corresponding oculars.

In the practical use of the coloring processes just described, the component parts of the tissue of the body conduct themselves almost without exception differently from the tuberculous bacilli. While the latter, in spite of the treatment with nitric acid, alcohol and vesuvian, keeps the dark blue color which they have taken, the remaining animal tissues, as already mentioned, lose the blue color again, and in the second coloring the grains of the cells as well as the products of destruction of the latter, further the little grains of the plasma-cells are dyed brown. Only some parts of the tissue make an exception, as hair and epidermis, which remain more or less blue-colored. Since in these last tuberculous bacilli are hardly to be sought for, the finding of bacilli in the tissues is made exceedingly easy, by their characteristic conduct towards aniline coloring matters. Even in the closest masses of grains and in the midst of broken down cells, which often take all possible forms, from the smallest little points and micrococci like forms, to the longish staff-like forms, one can with absolute certainty distinguish single tuberculous bacilli from these closely similar forms by means of their dark blue color, which in the brown-colored surrounding and owing to the light-absorbing power of the brown ground appear as staffs almost colored black. This noticeable difference in the color-reaction holds nevertheless, as must constantly be repeated, only for the method of coloring described here. A different preparation of the objects than the quick and good alcohol hardening of the organs, made the condition here, appears to bring about

other relations. For while usually the little grains of the plasma-cells conduct themselves like the cell-grains and show a different coloring from the tuberculous bacilli, I have lately seen a preparation, made by Dr. Benda's assistant in the pathological institute in Göttingen, in which tuberculous bacilli were not to be found, but on the contrary the grains of the plasma-cells showed themselves colored blue. Probably in this case the object from which the section was prepared had received a treatment with chromic acid or had not been hardened quickly enough in alcohol.

Accident comes to our help in proving the existence of tuberculous bacilli, since not alone the parts of the tissue take a different coloring, but also all other bacteria which I have known until now and examined, with the exception of the lepra-bacilli to be mentioned later, also react in an opposite manner from the tuberculous bacilli under Ehrlich's method of coloring. Bacteria coming from the mouth are almost always to be found in phthisic sputum. I have never seen that one of these numerous sorts of bacteria showed the same color-reaction as the tuberculous bacilli. This observation has been confirmed by many reliable investigations, and can be considered as an established fact. The same is true of the tuberculous bacilli occurring in the contents of the intestines, when tuberculous ulcers are present. When this sort of discharge is prepared and colored in the prescribed manner on the covering glass, it appears to consist almost wholly of bacteria; they fill the layer in such thick masses. But without exception they take a different color from the tuberculous bacilli, and especially is this the case in the smaller sorts of bacilli, which might perhaps lead one to mistake them for. A peculiar behavior is shown by a large sort of bacilli, which form somewhat large, oval spores standing on ends, in that the spores often keep a plainly manifest, sometimes indeed an intense blue color, while the substance of the bacillus is itself dyed brown. According to all appearance these spores only take the color a short time after their formation, but remain uncolored after they are older. Among the many spores of the contents of the intestines which belong to other sorts of bacilli, until now none have been found which took the color of the tuberculous bacilli. Also the spores of the inflammation-of-the-spleen bacilli, hay bacilli and others, which Dr. Gaffke examined at my instance with reference to this color-reaction, remained uncolored. On the contrary Dr. Gaffke found during these investigations that the spores of "shimmel-pilze" take a strong blue. Also a certain kind of yeast seems to take the color. Since a mistaking of tuberculous bacilli for the above mentioned spores and yeast is impossible, their diagnosis so far as it rests upon the color-reaction is not thereby prejudiced.

Of late I have examined many sorts of bacteria-bearing substances, such as decaying meat infusion, decomposing urine, blood milk, vegetable infusion, mire from swamps with Ehrlich's coloring method, but have never found bacteria which take the same color-reaction as the tuberculous bacilli. I must therefore consider all claims for the appearance of bacteria which conduct themselves in regard to color exactly like the tuberculous bacilli, and which are said to be found in sputum, decaying liquids, the contents of the intestines in healthy men and in swamp-mud, for mistakes and resting upon an erroneous use of the coloring method. I feel myself so much the more justified in this opinion since I almost daily see examples of the difficulties which the use of this certainly rather complicated color technique offers to most people.

Aside from the tuberculous bacilli, until now only one sort of bacteria has been known which takes color in the same way as the tuberculous bacilli; these are, as I have already mentioned in my first communication, the lepra-bacilli. This fact is so much the more worthy of notice, since not only the parasites belonging to tuberculosis and to lepra are similar in many ways and plainly nearly related, but, as is well known, those two diseases stand very near to each other anatomically as well as ætiologically. To be sure, the coloring properties of the two sorts of bacilli are not identical. For although the lepra-bacilli can be colored by the same process as the tuberculous bacilli, the opposite is not the case. The first take, as is well known and as Neisser first proved, the nucleus-coloring of Weigert, which the last do not. However similar the two bacilli are in figure, size, &c., as soon as it comes to a diagnostic distinction, it becomes easy to recognize them through their different response to Weigert's nucleus-coloring.

The example of the lepra-bacilli already teaches that the tuberculous bacilli occupy in no way an entirely exceptional position in regard to their response to coloring matters; it is therefore not improbable that in course of time other sorts of bacteria will be found, which possess the same or similar coloring properties as the tuberculous bacilli. But any influence on the apprehension of the ætiological importance of the tuberculous bacilli would not be exercised by such a discovery. For the special reaction against coloring matters is nevertheless not the only specific property of the tuberculous bacilli. They possess, as we shall see later also in biological relations, a number of other peculiarities, which give still more weighty reasons for separating them from the known bacteria as a specific sort.

In all such considerations it is very much to the point to bring to remembrance how the same relations exist in inflammation of the spleen. One will then see that inflammation-of-the-spleen bacilli possess no specific coloring qualities and nevertheless, as is universally acknowledged, are bacteria of a distinct kind and form the cause of inflammation of the spleen. Exactly the same might be the case with tuberculous bacilli if they did not accidentally distinguish themselves from other bacteria by color-reaction. If the latter is nevertheless a fact, it is certainly of value in diagnosis, but it is a great error to think that with the specific color-reaction of the tuberculous bacilli, their ætiological importance stands and falls.

Further it appears to me not improbable that in the near future still further methods may be found by means of which tuberculous bacilli can be colored. Ehrlich's coloring method has already experienced many modifications, of which theoretically the most worthy of notice is the fact found by Ziehl, that aniline can be replaced by other substances, such as phenol,  $\text{—C}_6\text{H}_4(\text{OH})_2$  —resorcine, &c. The statements of some authors, that the tuberculous bacilli may be dyed with pure fuchsine appear to hint that still other ways exist in which the coloring can succeed. The diagnostic importance of Ehrlich's method, even if other methods which have no exclusive character are found, suffers by no means. For that remains in spite of all a well established fact, that by strict following of Ehrlich's method the tuberculous bacilli conduct themselves in a manner wholly peculiar to them and are thereby to be distinguished from all till now known bacteria. The method has the value of a chemic reaction, which has made possible the distinction of substances difficult to divide, nevertheless only under the condition

that it be used exactly according to the given directions. It would be of special interest to be able to give the bacilli a brown or yellow coloring, because only under this condition would it be possible to get usable photographs of the tuberculous bacilli. Of late I have, to be sure, succeeded, with the help of a previously given treatment of the preparations, with a very weak solution of kali ( $\frac{1}{10}$  p. M.) to color the tuberculous bacilli a quite intense brown, nevertheless the preparations do not meet the demands required for photography. It is to be hoped that this difficulty will be overcome. But for the present I have been obliged to do without photographs, however much I have wished by means of photographs to render possible a reliable comparison between the form and size of tuberculous bacilli and other similar ones.

As another hindrance in the coloring of the tuberculous bacilli the temporary character of the coloring must be mentioned. After a shorter or longer time in the preparations enclosed with Canada balsam, the color of the bacilli begins to lose its intensity, very gradually it becomes less noticeable and finally vanishes completely. The preparations colored with methyl-violet and gentian violet pale most quickly, for in some cases the color of such bacilli vanished in two days. The preparations colored with fuchsine keep much longer, as do those colored with alkaline methylene blue solution. Why it is that the color is so fleeting, while the same color in the dyeing of other bacteria have proved themselves unchangeable for years, I am not able to say. But from the circumstance, that in a great number of prepared specimens single ones have been found which have preserved the color completely unchanged for almost a year, I must conclude, that some sort of conditions are present and may be found, which will make possible the retaining of the color.

Moreover the preparations which are so pale have not become entirely useless, as with little trouble they can be colored again. The Canada balsam must be liquified by heat, the specimen taken off carefully with a pinsel and put into oil of turpentine. After 24 hours it is laid in absolute alcohol and after another 24 hours into the color solution to go through the whole coloring process again. The tuberculous bacilli take the blue color just as intensely as at first, but their surroundings, on the contrary, appear less beautifully and clearly colored than before.

A reliable explanation of the difference between tuberculous bacilli and other bacteria in their action in regard to coloring matters appears to me impossible for the present, on account of the insufficient knowledge of the more delicate structure of the chemical constitution. On many grounds it seems likely that the tuberculous bacilli are surrounded by a coating, which acts differently toward coloring matter than the contents, as we already know to be the case with other bacilli. The bacilli dyed with methylene blue appeared thinner than those dyed with methyl violet or fuchsine. One sees in the groups in which the bacilli lie closely pressed together, that the methyl violet colored bacilli move, and the bacilli dyed with methylene blue and appear thin, are separated from each other by plainly manifest spaces. Further, the coloring of the bacilli intensely dyed with methyl violet in growing pale does not vanish uniformly, but an outer layer grows pale first, so that of the thick bacillus a thinner still intensely thread remains, which possesses about the thickness of the bacillus colored with methylene blue. Finally the firm cleaving together of the bacilli in the groups also speaks for the presence

of an enwrapping substance which joins them. It is therefore thinkable, that a coating exists, possessed with special properties, and enwrapping the bacilli, and that this allows the entrance of coloring matters under the simultaneous influence of alkali aniline and similar matters, but is on the contrary more or less impenetrable for acids. But in the face of the facts now known, one cannot go farther than to conjectures.

If I now go over to the description of the tuberculous bacilli themselves, although they were first made visible by the help of coloring matters, it appears nevertheless to the point, first to describe their properties as they make themselves known in a living condition and without being influenced by any sort of reagents. To get preparations for this sort of observation, only such tuberculous substances can be used as contain considerable masses of bacilli, because single bacilli cannot be distinguished with certainty in the masses of detritus without help of the color reaction. For this purpose I have used little tuberculous knots from the lungs of guinea pigs, after I had convinced myself by coloring of the great quantity of tuberculous bacilli in them; the little knots were crushed in a drop of blood serum free from bacteria, the substance spread about as finely as possible in the liquid, a drop of this liquid sufficiently large for microscopic examination spread out flat on the under side of a covering-glass and fastened with vasiline on to a hollow object-holder, in order to avoid disturbing currents in the liquid and a too quick evaporation. In a preparation prepared in this manner, in the microscopic examination conducted in the usual manner, that is to say in a suitable "abblendung" of the light by diaphragms, there are found among opaque heaps of indeterminate nuclei, brighter spots in which the formed elements lie less thickly, and here one notices numerous colorless, very fine and short little staffs. The same are mostly united in small groups; in those which lie singly aside from the so-called molecular motion, no motion of their own is to be noticed. The length of the little staffs is about from one-quarter to one-half of the diameter of a red blood corpuscle. An organization is not to be noticed in them, and one cannot re-organize their relations to the surrounding cells in this sort of examination, and if no farther observations could be made, one would rather believe he had some sort of lifeless forms before him than bacteria.

If such a covering-glass be lifted up from the concave object-holder, so that the bacilli-bearing substance be dried and then doubly dyed in the manner already described, then the numerous grains and remains of cells appear dyed brown, the little staffs on the contrary receive an intense blue coloring and distinguish themselves sharply from all known component parts of the animal tissue with which they are mixed. The bacilli do not show themselves in their full number until after their coloring; they may be distinguished not only on the thinnest spots of the preparation, but everywhere with full certainty, even among the thick heaps of cells. It is noticeable that the little staffs appear thinner after the coloring than in the uncolored condition, the reason for which is, that before the coloring they must be observed by light cut off by diaphragms, in which case the lines of interference on the borders of the object appear to enlarge its diameter, while the observation of the colored bacilli is made in full light falling upon it from all sides, through which all phenomena of interference are excluded.

In like manner one can examine the most various objects by spreading out the substance to be examined as to its contents of tuberculous bacilli on the covering-glass and by coloring the same. Nevertheless, one does not learn much more than that the bacilli are present in a tissue or in a liquid and in what quantity they are present. Their position and their relations to the surrounding tissues cannot, in this way at least, be determined. The examination on the covering-glass is therefore sufficient for liquids, but for tissues can only have a preliminary, provisional character. Only the examination of the prepared sections of hardened parts can give reliable information as to the presence and diffusion of bacilli in the tuberculously altered organs.

To find out whether bacilli are regular accompaniments of tuberculosis, I have examined as extensive a ground as possible. Materials for this investigation I have received for the most part from Dr. Friedlaender, who, at my request, and in the most obliging manner, made the rich material of the city hospital in Friedrichsham accessible to me, and from the director of the city hospital in Moabit, Dr. Guttman, who committed to my charge a number of cases of tuberculosis for examination. It is a pleasant duty in this place to thank both gentlemen for the help they have given to my work.

In the following description of the results gained in these investigations I must, in order to make a general survey, omit the historical enumeration of the single cases in the order in which accident placed them in my hand, and will speak of them as grouped according to the usual anatomic points of view. Before I turn to this, however, I must make a few general remarks. When a little tuberculous knot is examined in prepared sections, without the use of nucleus-coloring, and without the diffused light of Abbe's illuminating apparatus, it appears like a body formed of cellular elements thickly crowded together and therefore only slightly transparent. As soon as the little tuberculous knot becomes caseous in the centre the cells change into a more or less fine grained, almost opaque mass, in which fine details are not to be distinguished. But a thoroughly different image of the tubercle is gained when the prepared sections are laid into strongly refractive media and the examination is undertaken after the nucleus-coloring, and by diffused illumination. The youngest tuberculous knots then show themselves to consist of colored grains heaped together. Nevertheless the grains are not so closely packed but that a section of ordinary thickness appears transparent enough to make it possible to distinguish the most delicate form elements occurring in the space between the grains. The caseous centres of the tuberculous knots in the prepared section appear wholly changed; they appear almost uncolored and completely transparent because there the cells have died and take no coloring; only here and there in them are found the remains of nuclei going to pieces, in the form of colored grain groups which, to be sure, are pretty closely pressed together but still allow all single form elements to be distinguished. Larger caseous herds conduct themselves in the same manner. The caseous substance itself has become completely transparent by the treatment and shows only a light greyish-yellow color tone interrupted by single brown grains or groups of grains. Every single tuberculous bacillus can be distinguished with ease. The conceptions of the microscopic image of the tubercle and of the tuberculously altered tissue which usually obtain are to be modified according to the circumstances just described when the

examination of the pictorial reproduction of prepared specimens with nucleus-coloring and illuminated by diffused light is concerned.

As to the qualities of tuberculous bacilli in general, as they manifest themselves in the colored condition, the following is still to be mentioned.

They always appear in the form of little staves whose length, as has already been given in the description of uncolored bacilli, is equal to  $\frac{1}{4}$ — $\frac{1}{2}$  of the diameter of a red blood corpuscle (about 0,0015—0,0035 mm). The diameter of the thickness is as constant as the length of the bacilli is variable, provided that one and the same coloring method is used. Under the coloring method first used by me, with alkaline methylene blue solution, they appear considerably thinner than with the use of Ehrlich's method. It is difficult to fix the slight size relations about which we are here concerned without the use of photography. When I look through a considerable number of my bacteria photographs for bacilli which correspond best as to size with tuberculous bacilli, I find in F. Cohn's "*Beitrag zur Biologie der Pflanzen*," II Vol., 3 Book, in the photographs given in Plate 15, No 1, among club-shaped bacilli with spores fixed in their ends, very thin and small bacilli which, if magnified 700 instead of 500 times as in the photograph, would come nearest to the tuberculous bacilli. There are among these bacilli also some which are spore-bearing and which about give a representation of the spore-bearing bacilli to be mentioned later. Also in the bacilli taken from blood putrefaction in mice (*Mäuse septicæmie*) and shown in this work, Vol. I, Plate VII, Fig. 41, are bacilli almost as thick, but on the average somewhat shorter than tuberculous bacilli.

The tuberculous are usually not completely straight little staves; one usually finds slight breaks or bends and sometimes a crookedness which in the longest specimens goes so far as to suggest screw-shaped windings. By this varying from the straight-lined forms the tuberculous bacilli distinguish themselves from other bacteria which come noticeably near them in size relations according to the photographs.

The distribution of the bacilli in the tuberculously-altered tissue is a very varying one. Sometimes they are heaped together in dense masses, so that by a very slight magnifying power bacilli-bearing spots can be recognized by their blue color. Very frequently, however, they are present only in small numbers. One finds the bacilli with most certainty where the tuberculous process is just beginning or is in a state of rapid growth. Here they are to be found in moderate numbers and between the nuclei of the cells which are heaped together and which usually show the epithelioid character at an early stage. After a more careful observation it is manifest that a bacillus almost always lies close beside a nucleus, and that it is to be found in the interior of the cell belonging to this nucleus. One cell can often contain two or even three bacilli. In places, where the disease has made greater progress the number of bacilli usually increases extraordinarily. They then often group themselves into little heaps closely pressed together, in which the bacilli lie parallel and are connected, so closely that it is often difficult to recognize the fact that the group is composed of single bacilli. In this arrangement the tuberculous bacilli bear a great resemblance to the lepra bacilli, which are mostly grouped in this manner. The relation of the tuberculous bacilli to the cells cannot be decided in this stage, because the cells have already experienced great changes and

are in process of dying. Their nuclei begin to decompose and to change themselves into irregularly formed grains of very varying size. Gradually these become scarcer and there remains a uniform mass which will not take nucleus coloring and in which all the cells originally present have died. This mass forms what was formerly considered the essential part of the tubercle, as the bearer of the infectious material, namely, the caseous centre of the same. But, as a rule, this caseous substance is very poor in tuberculous bacilli. Only when the death of the cells and their change into the nucleusless caseous mass has taken place very quickly are the bacilli visible for a time in considerable numbers. It is plain that they retain the capacity of fixing the coloring matter longer than the cells perishing under their influence. But very soon the bacilli themselves undergo farther changes, either dying or go into the stage of spore formation, in which they gradually lose their power of taking color. In the last case only their spores remain in the caseous substance, and as until now no means have been found of coloring the spores of tuberculi in any way whatever, their presence after the vanishing of the tuberculi betrays itself only by the infectious qualities of the caseous substance in which they are imbedded. On account of the importance, formerly and even very lately, erroneously attached to the caseous products of the tuberculous process, it may not be superfluous emphatically to direct attention to the facts that in all tuberculous affections the tuberculi appear first, collections of cells joining themselves to these; and that the dying of these cells and the caseous change resulting from this are secondary processes.\*

The opinion which still, to a great extent, holds ground that the relation between the bacilli and the caseous degeneration is the opposite of this, that the becoming caseous represent the primary, and that by means of this a suitable breeding ground is prepared for the tuberculous bacilli, is therefore completely erroneous. For the anatomical comprehension of the tissue changes in consequence of tuberculosis the process of becoming caseous may be of interest, but for the ætiology of tuberculosis it has not the slightest importance.

If I have lately been charged with paying too little attention to the process of caseous degeneration in my account of the ætiology of tuberculosis, the charge is unfounded, for it rests upon a misunderstanding of my standpoint, since I have only treated the ætiological relations of tuberculosis, but have left the pathological details to the pathological anatomists, especially when they lie so far aside from ætiology as the caseous changes of the tuberculous tissue.

Of greater importance for the questions interesting us here are the relations of tuberculous bacilli to the gigantic cells so frequently appearing in tuberculously altered tissues.

These peculiar formations are so frequent in tuberculous tissues that it was for a time believed that they must be considered as characteristic of tuberculosis. Since the gigantic cells are almost always situated at the centre of the little tuberculous knot, the opinion has often been expressed that the tuberculous virus must be contained in their interior — has indeed been pointed out in the shape of very small grains.

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\* Baumgarten, "Ueber die Wege der tuberkulösen Infection." Zeitschrift f. klin. Med. Bd. VI, heft. I.

It has now been shown to be certain that the gigantic cells occur in other disease processes and are not specific products of tuberculosis. Nevertheless the conviction that the infectious material must be contained in the gigantic cells has proved itself correct. For as soon as gigantic cells appear in the tubercles, tuberculous bacilli are almost regularly found in them, and the relation of bacilli to gigantic cells is a manifold one.

In all slowly developing tuberculous processes, for example scrofula, spongy inflammation of the joints, etc., in which the bacilli are present only in scanty numbers, we find the bacilli almost exclusively in gigantic cells, and then always only one or at most a few specimens in each cell. But when, corresponding with the more or less intensive course of the process, the bacilli appear in considerable numbers, then the gigantic cells which may be present are more generously supplied with them, and the number of bacilli enclosed by a gigantic cell may reach fifty or more.

A single bacillus in the interior of a gigantic cell is sometimes not easily recognized, for it often happens that the little staff may not be in the horizontal plane of the prepared section, but is placed diagonally or perpendicularly, and then appears in the microscopic image not as a blue line but only as a point, which can only be traced to a certain distance and its staff form recognized by raising and lowering the tube. Since the contents of the giant cell take a more or less brown-color tone, the little staff does not always show itself in the characteristic blue, but in a darker, almost black color, the reason being that aniline brown absorbs the blue part of the spectrum, and therefore a blue object observed through a brown solution, must appear black. Attention should, by this opportunity, be given to the fact that bacilli never look blue but always black when the ground on which they are seen is brown, when, for example brown-colored nuclei lie under them.

Although, as already said, it may sometimes be difficult to find a single bacillus in a gigantic cell, bacilli which in considerable masses fill a giant cell give a so much the more striking picture, which cannot be overlooked, even by a weak magnifying power. In this case the giant cells appear like little blue circles which are surrounded by a brown wall, the nuclei of the giant cell.

The arrangement of the bacilli in the giant cells often takes a very peculiar form. When the nuclei of the giant cell form a closed ring, and, for example, only one bacillus is found within it, the same generally lies in the centre or at least only a little excentric.

The nuclei of the giant cell are often forced toward one end, that is in a unipolaric arrangement, especially if the cell possesses an oval figure, or one even longer in proportion to its width. In this case the bacillus is usually found in the part of the cell free from nuclei; it often takes a position exactly opposite to them, and lies in the extreme point of the nucleus free pole. In the observation of the giant cells the supposition involuntarily forces itself upon one that a sort of antagonism exists between the nuclei of the giant cell and the parasite enclosed by it, which effects the greatest possible distance between the nuclei and the bacilli. This remarkable opposition between nuclei and bacilli is most noticeable in those giant cells whose nuclei are grouped equatorially and which then a bacillus in each of the nucleus, free poles, or by a bipolar arrangement of the

nuclei in which, each heap of nuclei holds a bacillus as it were in check.

Also where larger numbers of bacilli are observed in giant cells the oppositional grouping of nuclei and bacilli can be noticed. Usually, however, an entirely different arrangement of bacilli occurs. It looks as if with increasing numbers the behavior of the bacilli towards the nuclei became more active. They force themselves, namely, more and more towards the periphery of the cell, squeeze themselves between the nuclei and finally break through the wall of the nuclei.

During this process it is very worthy of notice that the bacilli, in this case, regularly place themselves with their axis perpendicular to the surface of the giant cell, so that in a microscopic image if the upper curvature or the base of the gigantic cell be shown, they appear as points; when, on the contrary, the greatest diameter of the cell is shown, we get the image of a circle of rays formed of blue staffs.

Such a great increase in the number of bacilli appears regularly to be followed by the destruction of the giant cell; for in the neighborhood of giant cells supplied with radiately arranged bacilli, especially towards the interior of the tuberculous herds, one often finds groups of bacilli which show the radiate arrangement, but are no longer enclosed by brown-colored nuclei. Moreover, since many transitional forms are found, it cannot be doubted that such radiated groups of bacilli mark places in which giant cells were formerly found, whose nuclei have vanished, and of whose contents only the bacilli remain.

By the help of the microscopic images just described one can read about the following conception of the relations of bacilli to the cell contents of the tubercle without losing oneself in too venturesome hypotheses. The first stage in the development of the tubercle is the appearance of one or more bacilli in the interior of cells which bear an epithelioid character. How the bacilli get there can scarcely be explained, otherwise than that they are taken up from already existing tuberculous herds and carried along by such tissue elements as possess motion of their own, that is to say, by wandering cells, be they in the blood, the lymph, or in the tissue itself, for the bacilli possess no motion of their own. Only so is the peculiar fact to be explained that frequently single bacilli or little groups of the same are found dispersed at quite uniform and comparatively great distances from each other, as, for example, in scrophulosis, fungous and lupous tissues and in general in all chronic tuberculous affections. For a wandering cell which has taken up a bacillus takes therewith no such harmless burden as if it swallowed a grain of cinnabar, a particle of coal or other indifferent material. Laden with the latter it can still go over much ground, but under the deleterious influence of the bacillus changes occur in the wandering cell which soon bring it to a standstill. Whether the wandering cell perishes, and the bacilli are taken up by other cells present at the spot, which last then take an epithelioid character; or, as appears to me more probable after my investigations, the wandering cell transporting the bacillus itself changes into an epithelioid cell and after that into a giant cell must be decided by studies directed to that special point.

For the assumption that the bacilli are originally carried along by wandering cells, and that their dispersion in the tissue depends upon this, the following reasons can be given: In the first place I would like to bring to remembrance an

analogous process in which also staff-shaped bacteria are incorporated by the colorless cells of the blood. This case is the putrefaction of the blood in mice (*Mäuse-septicämie*) described by me in the "Investigations of the Ætiology of Infectious Diseases." In this disease bacilli very similar to the tuberculous bacilli are to be found in the interior of the white blood corpuscles, and at first there are only one or two specimens close to the nucleus; then they increase very rapidly in the cell, destroying the nucleus and finally bursting the cell in order, having become free, to be again taken up by other cells and to prepare for them a rapid ruin, so that in a short time the majority of the white blood corpuscles are found inhabited by bacilli. The tuberculous bacilli grow, as we shall see later, very much more slowly than the bacilli of septicämie (putre. of blood), and the cells laden with them can therefore manifest vital functions very much longer. The further course of both diseases is, in accordance with this fact, very different, in spite of the fact that the first beginnings of the bacteria invasion possess such great similarity.

Direct observation also speaks in favor of the assumption that tuberculous bacilli are first seized and transported by the wandering cells. This can best be recognized in the cases in which considerable numbers of bacilli are introduced directly into the course of the blood, for example, by injection into the ear veins of the rabbit. If an animal infected in this manner be soon killed, one still finds in the blood numerous white blood corpuscles which enclose one or more tuberculous bacilli, and moreover in the tissue itself of the lung, liver and spleen, genuine round cells appear which are provided with a simple or divided nucleus, still possess no epithelioid form, therefore exactly resemble the colorless blood cells and yet contain tuberculous bacilli. Another explanation of this, other than that they are wandering cells which took up the bacilli in the course of the blood and transported them into the neighboring tissue, will scarcely be found. Also in the case of guinea pigs into whose *bauchhöhle* (belly cavity) considerable numbers of tuberculous bacilli were injected, and which died in the course of the first week, the same appearances were found.

A third ground for this assumption appears to me to lie in the fact that in dead tissues, in such places, therefore, wherein the influence of the living cells upon the bacilli is completely excluded, when a lively growth of the bacilli takes place, they arrange themselves in typically formed groups which resemble the peculiar forms of the bacteria colonies in reinculturen of the same on blood serum. We must therefore consider these forms to be those taken by tuberculous bacilli when developing undisturbed and when their grouping is decided only by the variations and changes of place conditioned by their growth. Every other arrangement is to be looked upon as the working of some sort of disturbance, for example, that caused by currents in the liquids, or by the direct influence of movable tissue elements. So the relative positions of the bacilli in the giant cells, especially their position as opposed to the nucleus, and the radiating arrangement appear to me to be conditioned upon currents in the plasma of the cell, and not by motion belonging to the bacilli themselves, since the bacilli after the death of the cells do not change the radiating arrangement once taken. After the wandering cell which transported the bacillus has changed itself into an epithelioid cell and given up moving from place to place, the path-

ogenic influence of the bacilli prepares to spread itself out upon the neighboring cells existing within a certain circuit. Whether they have proceeded from cells already present in this place in consequence of the attraction exercised by the bacillus itself, or rather by the materials produced by it and diffused into the surroundings, all cells situated within a definite region change into epithelioid cells. The cell containing the bacillus suffers still greater changes. It grows constantly larger, while at the same time the nuclei constantly increase, and it finally attains the shape and size of the familiar giant cells. That the development of the giant cells really goes on in this manner can be seen from suitably prepared sections, which show all stages of development from simple epithelioid cells with one bacillus to the completely developed giant cell with many nuclei and many bacilli. As most suitable for the study of the development of giant cells I should consider the tuberculous tissue of cattle and horses, which is especially rich in giant cells and in which I have often seen the above mentioned transitional forms. The further fate of the giant cells is a varied one, according as the progress of the disease is rapid or slow. In the last case the number of bacilli enclosed by a giant cell is always a limited one. Usually there are only one or two. It is indeed scarcely to be thought that the bacillus found in a large giant cell is the same which caused the formation of the cell. One finds not infrequently in a giant cell a bacillus which is no longer so intensely colored as other bacilli in neighboring gigantic cells; I have also seen cases in which the giant cell contains a dark and strongly colored bacillus, and beside it a second, very pale one, which without careful attention would be overlooked. Furthermore I have sometimes found spore-bearing bacilli in the interior of giant cells. From all this I conclude that the giant cell is quite a durable formation, that the bacilli, on the contrary, do not possess such duration of life, and that they can only maintain themselves for a considerable time in giant cells, in that a new generation follows a dying one. Sometimes they form spores in the interior of the giant cells, and in this case leave behind them the germs of a later generation. But often enough the vegetation of the bacilli in the cell appears to die out and the empty cell then remains as a monument of their former presence. When one, as is often the case in a tuberculous tissue, finds quite numerous giant cells, and among them only comparatively few supplied with bacilli, one can then take for granted that many of the apparently empty gigantic cells contain spores of tuberculous bacilli; others, on the contrary, mark the places of former vegetations of bacilli, and one is tempted to institute a comparison with a volcanic region in which occur not only single active volcanoes, but a great number slumbering for a time, or completely extinct, these latter nevertheless bearing unmistakable marks of their former activity.

As to the fate of giant cells when the bacilli in them increases rapidly, we have already spoken. In this case the result is exactly opposed to the one just described; the giant cell is the conquered party; it is, as it were, burst by the tuberculous bacilli forcing themselves through the wall of nuclei. Its nuclei perish, dissolve themselves into little grains, and the cell perishes.

How it is that at one time the bacilli are conquered, or for a long time remain confined to definite spots and barely hold their own, that at another time their number increases rapidly and all cell elements in their neighborhood quickly

perish, only suppositions can be made, which cannot here be entered upon, but which I will discuss later.

The further changes which complete themselves in tuberculous tissue after the formation of the epithelioid and giant cells are all of a regressive nature. For the greater part they belong in the sphere of the processes described by Weigert as necrosis of coagulation, and lead to the death of the tuberculously diseased tissue and to the formation of the so-called caseous masses which so frequently form the interior of the tuberculous herds. The tuberculous bacilli usually vanish very quickly in the caseous masses, so that they are only to be met in younger herds, and are almost always wanting in older ones. In other cases after the vanishing of the bacilli vegetation, the tuberculous tissue may simply shrink and be changed into firm cellular tissue.

A very important property of the tuberculous bacilli must be mentioned here. It is the spore-forming property. As is well known, F. Cohn was the first to observe in the so-called hay-bacilli the appearance of shining little bodies which remained when the bacilli perished, had the power of germinating and growing to bacilli, and were to be considered the fruit form of the bacilli, receiving hence from F. Cohn the name of spores.

The appearance of the spore formation as it shows itself microscopically in bacilli tinged with aniline colors, is to be seen in a very instructive manner on photograph No. 76, Plate 13, in the first volume of these communications. The bacilli appear there with short joints, and mostly consisting of two joints. Some of these joints are evenly dark colored and still resemble completely the spore-free bacilli on photograph 75.

In many joints one notices, nevertheless, the appearance of a light point which increases in size gradually, while the colored contents of the joint withdraw more and more to the two ends, and the sides are bordered by fine lines marking the outlines of the joint. The bright space in the interior of the bacillus joint is the spore which in this specimen shows itself not by its brilliancy, since it is imbedded in a strongly light-refracting substance, but only by the absence of coloring material. With few exceptions the bacilli spores do not take the aniline coloring. The division into the articulation does not always appear so sharply defined as in the bacilli of this picture.

In many sorts of bacilli, as for example in those belonging to inflammation-of-the-spleen, the members appear closely joined together and form a continuous thread which contains the uncolored spores at regular intervals. The spore formation of the tuberculous bacilli conducts itself in like fashion. The bacillus preserves its connection and does not fall apart into separate joints, but a bright body appears in every joint so that the bacillus after coloring resembles a little dark thread interrupted by bright egg-shaped spaces. By the use of the strongest systems and great magnifying power it may then be shown that the spore-bearing tuberculous bacillus presents exactly the same appearance as the spore-bearing bacilli of inflammation-of-the-spleen, only in greatly diminished proportions. The spores are egg-shaped, bounded by a delicate colored line, and are present usually in the number of two to six in one bacillus. Since every single spore takes possession of one joint, from their numbers we can decide upon the number of the joints of the bacillus, that is to say of the single elements out

of which the same is formed. If a substance containing spore-bearing tuberculous bacilli be examined in the uncolored condition and in less strongly refractive liquids, the bacilli appear to be provided with brilliantly shining little bodies; these last can therefore not be vacuoles or simple gaps in the protoplasm of the bacillus, but must be genuine spores.

After these remarks as to the universal qualities of tuberculous bacilli, I now turn to the description of their action in the various tuberculous processes.

## A. TUBERCULOSIS IN MAN.

### I.—MILIARY TUBERCULOSIS.

Nineteen cases in all were examined in which the tubercles were found in the form of miliary and sub-miliary little grey knots, mostly provided with a whitish or weak yellowish centre, scattered in several organs, lungs, brain, liver, spleen and kidneys. The bacilli were wanting in the tuberculous knots in no one of these cases. The smaller and younger the knots were, so much the more plentiful were the bacilli, and they were thickest at the centre. As soon as the middle of the little knot will no longer take nucleus coloring, as soon, therefore, as the caseous degeneration begins, the number of bacilli decreases immediately. In the larger knots, whose centres had already experienced a far-reaching caseous change, few bacilli were to be found, and those only to be found between the nuclei of the epithelioid cells occurring in the periphery of the knot. Now and then one finds in the giant cells occurring on the border of the caseous herd, single bacilli or groups of the same. A noticeable feature which re-appears in the chronic processes of the lungs is this, that most giant cells contain black pigment grains beside which the bacilli are still easily to be distinguished. In other organs I have not seen such pigment-bearing giant cells, and their presence appears to be limited to the lungs. From the analogy of other results obtained from the lungs of swine and other animals, to be mentioned later, I might suppose that we here have before us giant cells which originally developed in the interior of an alveolus and took into themselves the pigment of the perishing cells present in the alveolus. This view is taken by Watson Cheyne on the ground of direct observations of giant cells which were found in alveoli of the human lung. (See Practitioner, April, 1883). These cells, which first developed in the alveoli next to the little knots, are afterwards taken up by them as the knots extend. In many of the older knots the bacilli appear to have vanished completely. Nevertheless, we must remember that the prepared sections of the larger tubercles always contain only fragments, and that if the bacilli are wanting their absence from the whole knot is not thereby proved. The relations here are similar to those formerly described in regard to the giant cells, that is to say, that beside those knots which still contain abundant bacilli others occur in which the bacilli have either entirely vanished or have left spores behind them. Nevertheless, if a sufficient number of sections are examined, one almost always finds spots rich in bacilli, and it would not be right from the results of a few specimens to give a judgment as to the presence or absence of bacilli in miliary tubercles.

In miliary tuberculosis of the liver and spleen, I have seen bacilli almost exclusively in the giant cells. Especially in the spleen, beside completely developed

tubercles, there are often found giant cells of considerable size, which are almost isolated or only surrounded by a few epithelioid cells, and are regularly the seat of one to three tuberculous bacilli.

The tubercles of the membrane of the brain were, almost without exception, rich in tuberculous bacilli. Frequently the latter are found in the immediate neighborhood of small arteries beside which are spindle-formed heaps of epithelioid cells; between the latter the bacilli are strewn in quite uniform numbers. But in many places the bacilli are present in such thick masses that their presence makes itself known, under a weak magnifying power through the blue color of the parts in question. In this case they are principally round cells, therefore younger cell formations, among which the bacilli vegetation has its seat. Sometimes also I have seen bacilli in the interior of the vasa.

Of miliary tubercles of the choroidee only one case was at my disposal, and that I owe to Prof. Weigert. Here also were formed herds without nuclei, (that is to say already developed caseous degeneration), which were surrounded by large giant cells, and many epithelioid cells. Partly in the giant cells, but also partly outside of them, between the epithelioid cells, a good many tuberculous bacilli were present.

With the exception of one case, comparatively old caseous herds were always to be found, especially in the lungs and bronchial glands. Also in these herds, which may be considered the point of departure for miliary tuberculosis, the presence of bacilli were proved in the cases which were examined with reference to them. Often, to be sure, they were only found sparsely in the periphery of the herd, but sometimes one discovered nests of dense masses of bacilli.

It would lead too far if I should here describe particularly all the cases of miliary tuberculosis which I have examined, and I select, therefore, only some of the most characteristic.

1.—Workman, thirty-six years old. Strong man, who had not felt unwell until fourteen days before being taken to the hospital, attacked with coughing; pains in the chest and moderate fever. The symptoms observed in the hospital were only slightly characteristic, and corresponded with those of catarrhal pneumonia. Under increase of dyspnoe the patient's powers sank rapidly and he died four days after his reception into the hospital. In the journal of dissection the following is worthy of mention. The pleura on both sides occupied by numerous little miliary knots. Both lungs infiltrated, greyish-red, and many little miliary grey knots present; the larger knots show caseous degeneration. In the conus arteriosus of the heart several sub-miliary grey knots of the endocard. On the closing border of the mitralis eruption of firm knots varying from miliary to the size of a pea. In the liver not very numerous little knots. Both kidneys contain grey little miliary knots in the pithy substance as well as in the outer coating in abundance. The hollow of the right kidney dilated, and in the same two defecti with indented borders and caseous base whose diameter is about  $1\frac{1}{2}$  to 2 cm. A caseous deposit of the size of a hazel nut in one papilla. Bladder free from tubercles. In the prostata some caseous deposits. In the urethra abundant little miliary knots. Caseous degeneration of the accessory testicles, partly with caseous softening, drawn in scars on the scrotum. In the testicles themselves abundant deposits of little grey miliary knots. The thoracic duct

dilated, on several spots on its wall caseous thickening, and on the inner surface of the same some defecti provided with caseous base.

Here we had a case of chronic tuberculosis of the uro-genital organs. The tuberculosis of the thoracic duct connected itself with this and had as a consequence, the breaking out of the general miliary tuberculosis. This case according to its origin belongs to the form of miliary tuberculosis described by Ponfick and forms a typical example of the same. The microscopic returns corresponded exactly with the description of the action of the bacilli as previously sketched. The tubercles in the lung tissue showed themselves comparatively small, and for the most part contained bacilli in abundance. Some contained so many that under a weak magnifying power a bluish color showed itself in the middle.

Many gigantic cells were also found in the tubercles of the liver and spleen, which for the most part were supplied with bacilli. Very numerous bacilli were present on the edge and in the surroundings of the herd in the papilla of the kidneys. At single points in the surroundings of this herd, the bacilli had collected in groups in the urethra, and the peculiar grouping here manifest suggested the figures which they take in blood serum culturen, and which are to be mentioned later. Whether the bacilli in this case reached the urethra via the course of the blood or whether they spread from the neighboring tissue, could not be decided. In another tuberculous kidney which I received from Prof. Weigert, numerous glomeruli and the neighboring urethra were covered with masses of bacilli, which leads us to conclude that the bacilli can make their way from the course of the blood into the urethra and from there perhaps into the urine.

2.—A second case of tuberculosis of the thoracic duct in a man forty-eight years old shows an analogous behavior. The tuberculous process had been here spread from the caseous mediastinal glands to the thoracic duct, and has brought about miliary tuberculosis of the lungs, liver, spleen and kidneys. Death followed later than in the first case; the tuberculous eruption was not so abundant, the single knots reached a greater size, were more caseous and contained a correspondingly smaller number of bacilli.

3.—Nine year old boy. Said to have been taken sick only a few days before his admission into the hospital. At his entrance into the hospital diseased sensorium, great restlessness and delirium with high fever. In the following days bronchial phenomena showed themselves, death ten days later. Dissection showed: caseous swelling of the bronchial glands; broncho-pneumonia herds in both lower lobes of the lung. Besides these, numerous grey miliary and sub-miliary tubercles in the lungs, in the enlarged spleen, in the liver and in the kidneys. At the base of the brain, and in the surrounding of the vessels a slight muddiness (*trübung*) and a great number of little grey knots.

In the tubercles of the lungs, liver and kidneys and spleen, bacilli were found in varying abundance. The tubercles of the pia mater were very abundantly supplied with them.

In the caseous bronchial glands belonging to this case, large quantities of bacilli were found, and not only on the borders of the caseous herd, but forcing themselves far into it. The parts of the gland tissue which were not yet necrotized contained numerous gigantic cells which were noticeable for the multitude of enclosed tuberculous bacilli, and for the radiate arrangement of the same.

Plainly the tuberculous process in the bronchial glands had only lately began and had spread rapidly. The gland tissue had become very quickly necrotized and softened under the influence of the tuberculous bacilli. Somewhere there must have been a breaking through into a vasalumen (gefäßslumen) and so considerable numbers of bacilli have got into the course of the blood to have caused the general eruption of miliary tubercles. The location of this breach was, however, not to be found in this case. That the same is not always easy to find may be seen from the following case.

4.—A strong man of about thirty years died after a sickness which showed typhoid symptoms and had not lasted longer than three weeks. From the dissection it appeared that there were very many grey little miliary knots in the lungs, liver and kidneys, as well as in the greatly enlarged spleen. The bronchial glands were swollen, of a marrow-like nature, but not caseous. Also, moreover, no older caseous herd could be proved, in spite of the most thorough investigation, so that one was loth to make a diagnosis of miliary tuberculosis. The intestines and mesenterial glands were not changed.

Microscopic investigation gave the following very noteworthy result: Sections from the bronchial glands showed wide-spread spots bare of nuclei, and which were only filled with black pigment grains, and numerous fragments of perished nuclei, together with dense swarms of tuberculous bacilli. These last were heaped together in such masses in the immediate neighborhood of little arteries that the vasalumen (gefäßslumen) appeared to be surrounded by a blue court, even under a slight magnifying power. A greater magnifying power showed these blue masses to be composed of bacilli. In single places the bacilli forced themselves even into the interior of the vasa, and there could be no doubt, therefore, that they found their way into the blood in this manner, and were transported in all directions in great quantity. A third method was thereby sought by which a general tuberculous infection and the miliary tuberculosis conditioned upon it could take place, after Ponfick had succeeded in discovering one of these ways in the thoracic duct, and after Weigert had taught the second, and to all appearance by far the most frequent, in the breaking through of tuberculous masses into the veins.

The miliary tubercles of the spleen and lungs contained a good many bacilli, partly also in the giant cells.

But this case was of great interest in another way. It appeared, namely, that numerous capillaries were filled for short distances with micrococci. Under the double coloring treatment, the tuberculous bacilli took, as they always do, the blue coloring, the micrococci, on the contrary, the brown color. In many places in the same field of vision, and at slight distances from each other, brown colored micrococci and blue colored bacilli were to be seen. The capillary micrococci embolism were moreover very numerous in the lungs, and especially in the spleen. They had not as yet led to striking changes in their surroundings, such as heaping together of nuclei or necrosis, and must therefore have appeared not many days before death. The combination of a bacilli and a micrococci invasion as it occurred here, belongs to the mixed infections whose appearance seems not to be rare. Such mixed infections can be generated artificially in animals by simultaneous or closely following inoculation with various infectious

materials, for example, by using inflammation-of-the-spleen and septicæmic bacilli in the case of mice. Also tuberculosis and inflammation-of-the-spleen can exist simultaneously in the same animal. I have inoculated a number of guinea pigs which were tuberculous to a great degree with inflammation-of-the-spleen bacilli. In consequence of this, the animals were attacked with inflammation of the spleen and died. Several of them had very large numbers of tuberculous bacilli in the lungs and spleen, and in sections from these, by double coloring, the tuberculous bacilli took the blue, and the very numerous inflammation-of-the-spleen bacilli took the brown color. As a further instance of a spontaneously arising mixed infection, the occurrence of micrococci herds in typhus is to be noticed. Further, Brieger and Ehrlich\* have drawn attention to a combination of typhus with malignant œdema, in which case the very fitting expression mixed infection was first used. It is therefore plain that we have such a mixed infection in the case here spoken of. The tuberculous disease of the bronchial glands formed the primary infection, which, in consequence of the rapid growth of the bacilli and their forcing themselves into the arteries, led to general miliary tuberculosis. Not until this disease was well established, the strength of the organism had been very much lowered, and therewith probably the ground for the micrococci invasion had been prepared, did the latter follow; proceeding to all appearance from an ulcerated defekt (imperfection) on the tongue, and causing in connection with the miliary tuberculosis, death so much the more quickly.

A similar combination of tuberculous bacilli in the miliary tubercles of the lungs, and micrococci in the neighboring vessels, has been observed by Watson Cheyne, † and it may therefore probably be accepted that with a little attention this sort of mixed infection might be not infrequently found.

Of the other case of miliary tuberculosis coming under examination, the following may be briefly sketched:

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\* Berl. klin. Wochenschrift 1882. No. 44.

†The Practitioner, Vol. XXX. No. 4, Apr., 1883, p. 295.

(*To be continued.*)

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## RECORDING CLINICAL OBSERVATIONS.

BY PROF. A. LIAUTARD, M.D., V.M.

A Paper read before the United States Veterinary Medical Association.

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*Mr. President and Gentlemen:*

Not long since, in reading an English veterinary paper named the *Veterinary Record*, my attention was attracted to a paragraph heading an article of that excellent hebdomadary, which I thought contained a suggestion of great value, and which it seems to me all veterinarians and especially, perhaps, those of America, might

do well to have printed in large letters in their studios as a memorandum of their duties to themselves, to their colleagues and to their profession. The paragraph reads as follows :

*“Careful observation makes a skillful practitioner, but his skill dies with him. By recording his observations, he adds to the knowledge of his profession, and assists by his facts in building up the solid edifice of pathological science.”*

How true those words are, and how powerful their meaning !

Deprived, as the veterinarian is, of many of the means of diagnosis of which the human practitioner may take advantage, how important it is for him to be able to refer to the works and the positive observations of his predecessors, to be able to recognize diseases, to be certain of pathological changes and correctly to direct his therapeutics. Indeed the question might be asked, what has made our pathology of domesticated animals in its various forms, whether equine, bovine, ovine, porcine and canine—how have our predecessors, from the works of olden times, to our recent and modern authors, been able to lay down the etiology, symptomatology, pathology and therapeutics by which to-day all of us and the veterinarians of the future are going to be able to fulfill the duties so variously assigned as physicians, surgeon, obstetrician, therapist or sanitarian.

The answer to these questions is a simple one ; it is that in those days, “careful observers had become skillful practitioners, and that, not to die with their skill, they had recorded their observations to add to the knowledge of their profession and assist in building the solid edifice of pathological science.”

But is our pathology yet perfect ? Is our knowledge as positive as it should or might be ? Can we boast that the symptoms of ALL diseases are mastered by us ? Are we not liable to make, and do we not often make errors of diagnosis ? Are there not, among the numerous disease to which animals are subject, still many of which we know so little that our medical knowledge remains unable to detect them, or to cure, or even sometimes to relieve them ?

If these queries are suggestive of facts, what are our obligations, and does it not become a duty that imposes itself upon

each of us as simple individuals, toward our colleagues and toward our profession and its noble calling, to make a written record of the result of our observations, that we may thereby make ourselves live for ever—so to speak? By doing so we help our brethren in the profession in the performance of their duties, and by it we build up the most perfect and solid edifice of pathological animal science.

If these remarks are proper, gentlemen, I hope you will grant me a little more of your attention in suggesting briefly the rules which I believe ought to be observed in the redaction of clinical observations.

The writing of reports constitutes the minute-history of diseases. They are documents that ought to be specially correct, and gathered in a regular manner, and I might say always with the same method, to allow ulterior researches. The report of a case might be divided into five sections, viz: the description of the patient; the history of the case; his condition when called to attend to him; including the diagnosis, the prognosis, the treatment, the result, and his cause of death through the post-mortem.

The description of the patient we believe ought to be as complete as possible. The color, sex, age, breed, aptitude to special work and general constitution, are all more or less important points; some affections being more common in various animals, and almost specific to them, more than in others, and this is in many instances due to the very peculiarities mentioned in that description. If, for instance, stallions are more commonly affected with hernia, young animals are more subject to peculiar forms of infectious diseases than old ones; light-colored animals suffer more with pigmentary affections than dark ones; lymphatic animals are more liable to blood diseases than nervous individuals; saddle horses will be exposed to bruises which are seldom met with in heavy draught animals, and weak, debilitated animals will be more exposed to diseases in general than strong and robust ones.

The history of the patient, or the "*commemoratives*" is of the greatest importance, and yet it is not always fully appreciated by veterinarians. How many times have we witnessed an attempt

to make a diagnosis without a history of the patient, and how can this be accomplished with positiveness, is yet a problem to me. Truly, a practitioner may indeed, after years and years of close observation and labor, be able to express an opinion upon the nature of a case, and be correct in it, but still errors must often occur.

I don't ignore the fact that the alleged history is often an imperfect one, and perhaps misleading, but with all that, I believe no one is justified in overlooking its value. The manner of obtaining the history of a patient may be divided in two parts—first the interrogation of the owner and that of the patient himself. Questioning the owner is almost an art, which though at first may seem simple and easy, yet requires tact and practice, and close attention to be of value. The questions must be made and repeated at variance, to obtain clues to the truth, since often, for reasons that cannot be discovered, the answers are deficient and erroneous, if not untruthful, and too often they are intentionally given in a way to mislead the deductions of the closely attentive inquirer.

To illustrate the importance of this point, I can only mention the case of a horse being brought to my observation some twenty years ago, with the simple history that could be obtained, that the animal could not eat, and in which a simple diagnosis of simple sore throat was about to be made, when by chance a dog passing within his reach, the horse sprang towards him with rage. Surprised by this action, I inquired of the owner if the horse had ever been bitten by a mad dog, and then he remembered that some time before a strange dog had entered his stall and bitten him, and that in being brought to me he had several times, when meeting dogs, attempted to rush at them and take hold of them. This part of the history was sufficient, and too characteristic to allow a doubt as to the nature of the disease. The poor horse succumbed a few days later to an attack of the most violent rabies I have ever seen.

The interrogation of the patient is no less important, and is a task often difficult to perform. Unable to obtain from the sick animal by words the answers necessary, the veterinarian must

consult his motions, his aspect, often his desires, and often from nothing, make his conclusions. Everything must be carefully weighed and considered without partiality or pre-conceived idea.

The condition of the patient forms a very important part of the record, for it is that condition that will help the practitioner to justify the diagnosis he may make, help others to recognize the same disease, and help the making of a correct veterinary pathology.

The description of the symptoms may be considered as of those which may be called specific and those which affect the entire organism, and are of a general character. An alteration in the function of respiration as characterized by an increased dilation of the nostrils; an acceleration of motion at the hypochondriac region or at the flanks; changes in auscultation and in percussion; peculiar forms of coughing—all these may be considered as specific symptoms of lung diseases. The general symptoms are those that are offered by the changes found in other functions, such as the condition of the circulation, as indicated by the pulse and appearance of the mucous membrane; the condition of the digestion by the appetite; the state of the abdomen by the aspect of the fæces; the condition of the nervous centers by the more or less marked diminution of the strength of the animal, and a general febrile condition by the registered heat of the thermometer.

These general symptoms ought not to be neglected, and in mentioning them I do it because I am afraid many of our young practitioners and recent graduates may be too apt to overlook their value.

When these are well obtained and recorded, and not until then is the practitioner ready to make his diagnosis, that is to specify its nature and its seat. Truly this will then, in many instances, be easy to make, but often, also, it will be sufficiently difficult, and it is then, when the answers to all these observations remain obscure, that still more their importance presents itself and becomes emphasized.

To prognosticate, in its etymological acceptance, means to

presume. Therefore, the prognosis becomes the presumption of what will take place. In some circumstances it is easy to predict the result, as suppurative pneumonia generally terminates by death; but in other circumstances the presumption is subject to many circumstances, and in that case the prognosis is guarded.

The fourth chapter of a report is to be considered under two headings. First, that of a surgical; second, that of a pathological case. If of the former kind, a minute description of the surgical manifestation is always indicated, and especially so during the operation, if complications, accidents or abnormal structures are met with. When this is done the case is recorded as in the second heading, that of a pathological case, that is, an exact and concise daily description of the condition of the patient while under treatment, with the results obtained, changes observed, modification prescribed in the therapeutics formerly used—and then comes the fifth chapter.

Recovery or death. The last ought always to mean a post-mortem. The examination of cadavers is most essential. It is by this that the true causes of death are found.

The cadaver is then a book, in which the described diseased process can be read, and where every organ represents as many pages, on which are written the pathological lesions resulting from it. It is in many cases a confirmation of a diagnosis and a gratification to the practitioner. But if the diagnosis is disproved by the post-mortem, a much greater amount of valuable information is obtained, and a most beneficial teaching secured. Post-mortems ought to be carefully made, and above all most minutely recorded.

Some time ago, in an editorial note in the *AMERICAN VETERINARY REVIEW*, relating to an excellent article of our friend Dr. Clement, I called the attention of my readers to the record of three reports of post-mortems, which he had made, and which he published as an example of the manner in which this work ought to be done. I will not take any more of your time by reading these, but will strongly urge you to read them in the *Reference Hand-book of Medical Science*.

## MEDIATE CONTAGION.

ANSWER BY DR. GADSDEN.

A Letter read before the United States Veterinary Medical Association.

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*My Dear Doctor :*

Your kind favor of the 4th inst., containing an invitation to attend and address the annual meeting of the United States Veterinary Medical Association, on the subject of "Mediate Contagion" in contagious pleuro-pneumonia, was received at my house during my absence from the city, and was forwarded to Longport, and failing to reach me there was returned to Philadelphia, where I received it yesterday. I regret very much that the invitation came to me so late that I will be prevented from accepting it by other engagements which I had made before receiving it, and the shortness of the time will prevent my writing anything on the subject further than to reiterate the views expressed in my former paper, a copy of which I will mail you on my return to the city to-morrow, together with any new facts I may be able to gather in the brief time before your meeting.

It was a long time before some of our professional brethren could be convinced of the truth of the theory which I held, that the disease was spread by the chronic or so-called recovered cases, but even our friend Dr. Salmon I think will now admit, after the careful experiments he has made, that this theory is correct. And I feel assured that it is but a question of time when he and the others who now hold to the contrary opinion will be convinced, if they will devote the same care to experimenting, that the disease can only be communicated by contact with the living diseased animal. Now by contact I don't mean an actual *rubbing* together of the diseased and healthy animals, as would seem to be implied by Prof. Law in his rejoinder, but their confinement together in the same building or small enclosure, where the germs exhaled in the breath of the diseased animal can be inhaled by the healthy ones. For I am thoroughly convinced that after the death of the animal any germs that may have been contained in its carcass lose vitality, and the power to infect the

lungs of a healthy animal. While it is true that the serum from a diseased lung can, after being carried a long distance and kept for a considerable time, be introduced into the tail of a healthy animal, and produce inflammation and febrile symptoms, yet a post-mortem would fail to show the slightest trace of the characteristic lesions of pleuro-pneumonia in the lungs.

I am equally convinced that no infecting power remains in any germs that may have found lodgment in litter or refuse or in any portion of the stable or buildings, and cannot see the slightest necessity for ordering the destruction of buildings, or compelling them to remain empty for weeks or months, except to entail unnecessary loss and expense upon the unfortunates who have had diseased animals and got rid of them.

While as a matter of cleanliness and for the purification of the atmosphere of a stable, the use of lime and other disinfectants is not at all objectionable, yet I do not believe it necessary, if all the diseased animals and those that have been in contact with them have been entirely removed, and the stable refilled with perfectly healthy animals among which are no "recovered cases;" for these latter have been the means of spreading the disease in many instances; where not suspected themselves, they have infected healthy animals, and the litter or buildings got the credit for it. Kill all chronic cases and animals that are diseased or have been in contact with diseased animals and you need have no fear of inanimate objects as mediums of contagion.

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## BIBLIOGRAPHY.

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ROARING IN HORSES—LARYNGISMUS PARALYTICUS. By George Fleming, C.B., LL.D., F.R.C.V.S., etc. Bailliere, Tindall & Cox, William Street, Strand, London.

This is an excellent little work of one hundred and sixty pages, handsomely illustrated, for which his professional brethren are indebted to that indefatigable observer and author, George Fleming. The disease of roaring, with its surgical treatment, has for some time engaged the attention of English veterinarians, among whom it has become a subject of much controversy. The

publication of the first report of the discovery of a new surgical treatment for this affection, and the announcement of the success which had followed its application, at once excited public attention, and a large amount of criticism found its way into the veterinary press, many of the writers expressing their doubts, and a portion of them their entire dissent in regard to the correctness of the published reports. Experimental tests were made by various practitioners, and the occurrence of failures in these numerous cases seemed to confirm the negative verdict upon which the dissenters had agreed. We were ourselves included in this class. Misled by errors of statements contained in the early reports, the experiments failed to be successful in consequence of the improper operations which had been described, or rather, because those which were performed were not identical with those which Dr. Fleming had described in his "Roaring in Horses." It seems that the conclusions were too hastily adopted, just as the experiments had been too hastily made. They were, in fact, made on false interpretations of the *modus operandi* required for the relief of this serious disease.

In this little book the author does not limit himself to a mere description of the operation, but adds to it an excellent and most complete treatise upon the affection, the treatment of which has hitherto baffled the skill of veterinarians.

In a series of chapters, the reader is fully interested in the history and the etiology of the disease, with its various predispositions, and symptoms and pathological anatomy, and is then inducted into the various forms of preventive and curative treatment, the concluding portion consisting of a minute description of the true surgical steps of the process, from which the prevailing sensation has risen, and which has resulted in the controversy which has been so vigorously maintained. The literary execution of the work has been performed with the characteristic ability of the author, and is marked by the same clearness of statement and easy and graceful style of composition which those who are familiar with the writings of the author have learned to expect from the practised pen of Dr. Fleming.

A number of well executed plates illustrate the work, and

cannot fail to assist the interested reader in following the carefully prepared text. The book is a valuable one, and its publication cannot fail to add largely to the well won reputation of the author. It doubtless will, as it ought to be, thoroughly appreciated by all English-speaking practitioners, if for no other reason than its agency in correcting, as it does, existing erroneous impressions, by furnishing to the profession a conclusive and satisfying answer to those who would now charge upon veterinary science the existence of an uncured roarer as an opprobrium which it is unable to throw off.

PHYSIOLOGY OF THE DOMESTIC ANIMALS. By Robert Meade Smith, A.M., M.D. F. A. Davis, Philadelphia.

Taking into consideration the progress which comparative medicine has accomplished within the past few years, and especially that which involves the department of veterinary science, and considering, moreover, the number of the works which have enriched the bibliography of English veterinary literature, is it not a remarkable fact that while all other branches of this science have been more or less fully treated, one of them, indeed one of the principal, and as important and essential as any of the preliminary studies which are introductory to all the others, that of physiology, to wit, should alone have been ignored? For years veterinary schools have been established and in progress in England, Canada and the United States, with hundreds of students crowding their halls, and hundreds have been graduated who were supposed to have studied veterinary physiology, yet how have they been able to do so? In fact they have been obliged to learn the physiology of the horse by studying that of the human animal. It is true that there is a great deal of similarity and sometimes somewhat of identity in the execution of the various functions of the body in all animals, but there are likewise great and important differences, and the student who has not acquired a knowledge of foreign tongues, and cannot study the works of French or German authors in the original, can never be without a disappointing sense of his inability to educate himself in his profession as thoroughly as he might and ought to desire. Veterinary

physiology in English has thus long been a desideratum in our schools. Dr. Robert Meade Smith has, however, now amply filled the want so long felt, and has done it in as proper a manner as the most exacting of critics could demand.

His work of over nine hundred pages is divided into three parts. In the first, the general physiology of cells is extensively treated, under three sections, including respectively, their structure, physics and chemistry. The second part introduces the important subjects of food, the functions of digestion being minutely described, and the process of rumination receiving careful attention, and following this come in their order the phenomena of the circulation and respiration, with the various secretions, mammary, renal and cutaneous, and in time the subject of general nutrition, and the physiology of motion, to the veterinarian perhaps the most important of all, and then succeeds the physiology of the nervous system, with that of the various senses, which completes this long and very interesting second part. The third division is entirely appropriated to the function of reproduction.

The general make-up of the work is highly creditable to the publisher. Four hundred illustrations are introduced, and it is altogether a handsome volume. In the preparation of so comprehensive and excellent a work, Dr. Smith has of course been obliged to avail himself largely of the labors of those who have already surveyed the same field, and he does not fail amply to acknowledge the fact. We have, for example, in several places recognized the work of our former teacher, the great Colin, of Alfort, but it would be impossible for this to be otherwise. Dr. Smith has conferred a great benefit upon the veterinary profession by his contribution to their use of a work of immense value, and has provided the American veterinary student with the only means by which he can become properly familiar with the physiology of our domestic animals. Veterinary practitioners and graduates will read it with pleasure. Veterinary students will readily acquire needed knowledge from its pages, and veterinary schools which would be well equipped for the work they aim to perform, cannot ignore it as *their text book* in physiology.

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OBITUARY.

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JULES C. A. DE FAVEL died of cancer of the liver in San Francisco, California, in the month of March. Graduated at Alfort, France, he occupied a prominent position in the French colony of San Francisco, where he was highly respected for his learning and skill. He held several positions under the United States and had an extensive practice. He died at the age of 58 years.

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SOCIETY MEETINGS.

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## UNITED STATES VETERINARY MEDICAL ASSOCIATION.

The twenty-sixth semi-annual meeting of the United States Veterinary Medical Association was held at Young's Hotel, Boston, March 19th, 1889. Pres. Huidekoper called the meeting to order at 11 A. M.

On roll call the following members responded to their names—Drs. Bailey, Berns, Thos. Bland, Blackwood, Breakell, Bryden, Clement, Cochran, Faust, Flagg, Gill, C. H. Hall, Harrison, Hawk, Hoskins, Howard, Huntington, Huidekoper, Hitchcock, Liautard, Martinet, W. B. E. Miller, L. McLean, R. A. McLean, Mustoe, Osgood, Peters, Peabody, J. L. Robertson, A. A. Rose, Ross, T. B. Rayner, Jos. B. Rayner, J. S. Saunders, R. J. Saunders, J. H. Stickney, Simmonds, Sherman, Tuttle, Winchester, Chas. Winslow, and Zuill. Drs. Russell, of Maine, W. T. Russell, of New Hampshire, and Bronnell, of Massachusetts, were present as applicants for membership.

The minutes of the annual meeting were read and adopted.

The report of the Comitia Minora was then read and adopted, directing a revision of the Constitution and By-Laws.

Drs. Hinckley and Lusson were recommended for membership and afterwards elected.

The application of Dr. Edgar R. Marlin, of Philadelphia, was rejected on the grounds of violation of code of ethics, in holding a contract under Live Stock Insurance Company, to the detriment and injury of his fellow members.

The following resolution offered by Dr. Huidekoper, was adopted :

*Whereas*—The Comitia Minora find that many of the By-Laws of this Association have been violated, that candidates elected have attended meetings without payment of dues, or signing the constitution ; that members have been dropped from the rolls without notice being given to the Association: Therefore,

*Resolved*—That the committee appointed to revise the Constitution and By-Laws consider if names exist on the rolls of the Association which are not entitled to membership, and report the same at the next meeting.

The recommendation of the Comitia Minora to hold the next annual meeting of the Association in September, in Brooklyn, was adopted.

The Committee on Intelligence and Education, through the Chairman, Dr. Coates, made an interesting report of the various veterinary movements during the preceding six months.

The Chairman, Dr. Liautard, made a brief report of the lack of success of the Committee on Army Legislation.

Under the head of new business Dr. Liautard offered the following resolution:

That this Association shall hereafter hold only one meeting yearly, on the third Tuesday of September, and that the officers of the Association make the necessary arrangements to have said meeting last at least two days. On being seconded it was laid over until the next meeting of the Association.

The afternoon session commenced at 1:30 P. M., when the Chairman asked for the reading of essays.

Dr. Winchester responded with one on the subject of "Tuberculosis," giving in interesting detail the history, mode of development and dangers of the ingestion of food and flesh from these tubercular subjects. In his excellently prepared article he quoted leading authorities abroad and at home, showing the danger and means of transmission from animal to man.

The reading of the paper was followed by remarks from Dr. Miller of New Jersey, showing its prevalence in his State and the rapid increase it was making, with no law or safeguards to delay its progress and dangers.

Its existence in New York State was referred to by Dr. J. Faust, who specially quoted an incident of its rapid destruction of the usefulness of a herd of thoroughbreds, likewise referring to the existence of laws in the seventeenth century against selling the milk or using the flesh, in Germany, and contrasting the absence of such safeguards now.

Dr. Liautard in a few well chosen remarks called for some means of arousing public sentiment to the importance and grave dangers of this disease, and suggested that veterinarians should in their States and respective localities use more freely the channels of the public press, to aid them in at least limiting its progress, and lessening its evils.

Dr. L. McLean of Brooklyn, reasoning from the admitted and undoubted facts of its transmission from animal to man, and the recognized gravity of the danger by the veterinarian, suggested that if the milk cans from some of the herds infected with tuberculosis were labelled "consumption at eight cents per quart," it would not be putting it too strong, and would probably arouse the people from their state of lethargy. He then painted a word picture of the head of a family afflicted with consumption, to whom only an overcrowded hospital for such cases could be recommended, while the fruitful cause of his sad affliction remained undisturbed and unguarded.

Dr. Peabody of Rhode Island referred to its extensive inroads in his own State, and quoted a case from his own experience of the dire results following the use of milk from an infected cow, where she was selected specially for milk purposes. Also to its development in cats, when fed tubercular meat from animals dying from tuberculosis.

Further remarks were made by Mr. Stockbridge, of the Massachusetts Cattle Commission, verifying many of the statements made by the essayist, and reporting recommendations made by the State on the subject.

The further discussion of the subject was entered in by Mr. Sessions of Massachusetts, and several others, after which a vote of thanks was tendered the essayist.

The President then announced the following Committee on Revision of the Constitution and By-Laws—Dr. Miller of New Jersey, Dr. Goentner of Pennsyl

vania, Dr. Clement of Maryland, Dr. Harger of Pennsylvania and Dr. Robertson of New York, with the President and Secretary members ex-officio.

Dr. Liautard then read an article entitled, "Recording Clinical Observations." It proved to be one of the most suggestive papers read before the Association. The advice and suggestions it contained were fraught with great value to the coming generation of veterinarians, if followed by the present, in building up through the channels of records of clinical cases, a literature for the veterinary world that would broaden and increase its value to an inestimable extent.

After some discussion, Dr. Gadsden's paper on "Mediate Contagion of Contagious Pleuro-Pneumonia," was read by the Secretary, and the discussion of the same was on motion postponed to the annual meeting.

The President called attention to the International Medical Congress to be held in Paris the coming summer, and suggested that credentials of this Association be furnished any members who expect to be in Europe at that period.

The meeting then adjourned to meet in Brooklyn September 17th, '89.

The evening was spent around the banquet table, where forty-three members partook of the bountiful provision of good things so well prepared by the local Boston Committee, and the day's enjoyable festivities and renewing of fraternal relations were completed by responses to the following toasts:

"The Veterinary Profession in the United States," Prof. A. Liautard. "The Veterinary Profession in Canada," Dr. Bryden. "The Medical Profession," Dr. Ernst. "The Relations of Veterinary Medicine to Sanitary Science," Dr. L. McLean. "Agriculture," Hon. W. R. Sessions. "Relation of the Veterinarian to the Agriculturist," Hon. Levi Stockbridge. "The Press," Dr. Huidekoper. "The Humanitarian part of the Veterinarian," Col. Currier. "The Early Days of the Association," Dr. J. H. Stickney. "The Ladies," Dr. J. Faust, and several other toasts of a more local character by members of the profession.

W. HORACE HOSKINS, *Secretary*.

## PENNSYLVANIA STATE VETERINARY MEDICAL ASSOCIATION.

The annual meeting of the Pennsylvania State Veterinary Medical Association was held at the Veterinary Department of the University of Pennsylvania, on Tuesday, March 5, 1889, at 10 A. M.

President Thomas B. Rayner called the meeting to order, and on roll call the following members responded: Thos. B. Rayner, W. S. Kooker, W. L. Zuill, Goentner, Blank, Hart, Weber, Ridge, Hoskins, J. C. Michener, Keil, Geo. B. Rayner, Custer, Reinhart, Collins, Glass, Jos. B. Rayner, Sallade and Williams; As guests and applicants for membership—Dr. L. McLean of Brooklyn, W. M. Brodhead, W. H. Ridge, Robert Tonnad, R. G. Webster, Chas. Bland, R. A. Hummel, A. Maurise, W. B. Montgomery, A. F. Schrieber, J. S. Butterfield, J. Z. Tintsman, E. D. Bachman, T. W. Corbyn, Jas. Graham, James T. Ross and Connolly.

After reading of minutes of last meeting and approval of the same, the Association proceeded to elect officers for the ensuing year as follows—President, Wm. L. Zuill; First Vice-President, James B. Rayner; Second Vice-President, Chas. T. Goentner; Third Vice-President, J. Curtis Michener; Recording Secretary, S. J. J. Harger; Corresponding Secretary, W. S. Kooker, 457 North 4th

street, Philadelphia; Treasurer, Jno. R. Hart; Board of Trustees—W. Horace Hoskins, J. C. Michener, S. J. J. Harger, C. J. Blank and Alex. Glass.

The following names were favorably passed upon by the Board of Trustees, and elected to membership of the Association—Drs. Tonnad, Broadhead, Ridge, Montgomery, Webster, Ross, Graham, Schrieber, Tintsman, J. S. Butterfield, Maurise and Bachman.

The Committee on Legislation, through its Chairman, reported the condition of the bill before the State Legislature, and though the bill was not in the best shape, it was fully expected to become a law in almost its original shape, as the opposition to the bill was very slight.

Dr. Zuill, Chairman of Committee on Sanitary Science and Police, made an extensive and highly commendable report, suggesting a plan for properly covering the State, and for thorough inspection of meat and milk. His remarks as to the existence of glanders and farcy, the prevalence of tuberculosis and pleuro pneumonia were interesting and commended very highly the work of the Bureau of Animal Industry in this latter disease.

The report of Committee on Intelligence and Education was called for, and the Chairman, Dr. Hoskins, covered the present condition of the profession, and outlined the vast work before the Association and its members in the future in this State.

Under the head of new business, it was decided by a unanimous vote, to publish in pamphlet form the reports of Drs. Zuill and Hoskins for distribution.

The Corresponding Secretary, Dr. W. S. Kooker, referred in suitable terms to the very great aid he had received throughout the whole State from veterinarians in furthering the work of securing legislation.

The meeting then adjourned to lunch, which was prepared by the Keystone Veterinary Medical Association, at which all the members found pleasure in mingling together, and at the same time satisfying the appetite with viands of a very enjoyable character.

The afternoon session was devoted to reading of papers and discussion of the same.

The first paper was on the subject of over-checking, by Dr. Zeno S. Keil. The writer took very strong grounds against this method of reining horses, and criticized severely the results of the same, and the pain and suffering inflicted upon the animals so used.

The next essay was on the subject of cremation by Dr. Jas. W. Sallade. The reading of this most elaborately prepared article was a source of some amusement as to what its practical bearing was upon the veterinary profession, and though a very grave sanitary question among men, the writer failed to bring forth the value of the adoption of the same among the comparative animals.

After seating of the new officers and some other routine work, the meeting adjourned to meet in Pottsville in September.

W. HORACE HOSKINS, *Secretary*.

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# AMERICAN VETERINARY REVIEW,

JUNE, 1889.

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## EDITORIAL.

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DR. PAUL PAQUIN "ALL RIGHT," BUT MUST NOT DO SO AGAIN.—Our first report fortunately contradicted—the good news received upon the authority of the *Breeders' Gazette*—our pleasure and congratulations at the present escape of a fearful death—the profession cannot afford the death of such a good worker. FIFTH INTERNATIONAL VETERINARY CONGRESS.—The time is approaching—our repeated calls to American veterinarians—will they answer them?—the request of President Chauveau and of Director Nocard—the Congress promises to be most interesting—the date fixed—the programme published. INOCULATION AND PLEURO-PNEUMONIA.—Our knowledge of the work done by the Bureau of Animal Industry—how is the work progressing? a positive answer difficult to give—change of officers—prospects doubtful—what will the result be?—shall we be obliged to have recourse to inoculation?—is it advantageous?—the results obtained in Australia—the letter of the Chief Inspector of Stock. HOG CHOLERA.—A collection of all that has been done in relation to it, and of all the investigations of Dr. Salmon, presented in concise book-form—advantages of such a book—principal conclusion of the author. VETERINARY LEGISLATION.—The laws of California and of New Jersey.

DR. PAUL PAQUIN "ALL RIGHT," BUT MUSTN'T DO SO AGAIN.—In last month's REVIEW we mentioned the threatening condition of Dr. P. Paquin, who was reported to have incurred the dangerous experience of an inoculation with the virus of glanders. Though we have received no direct information to the contrary, it gives us great pleasure, upon the authority of a paragraph in the *Breeders' Gazette*, to aid in the circulation of the gratifying intelligence that the Doctor has, if not wholly recovered, at least reached a condition of full convalescence. We are pleased to learn that the doubts which we intimated as to the correctness of the diagnosis in this case have been so fully certified by the event, inasmuch as the positive inoculation of glanders must in any case necessarily involve the one prognosis, which is at once adverse and absolute. With the *Gazette*, we congratulate the Doc-

tor on this fortunate postponement of his final encounter with the grim enemy. His present escape from death's clutches is good news, but we hope the Doctor will not again give us such a fright. The veterinarians of the present age cannot afford to have their ranks depleted by the loss of intelligent workers like Dr. Paquin, and our rejoicing over the news of his recovery can only be fittingly measured by the anxiety and sorrow which have been excited by the erroneous announcement of an accident which might easily occur within the limits of the most ordinary probability, in the experience of any busy veterinary practitioner.

FIFTH INTERNATIONAL VETERINARY CONGRESS.—The time appointed for the Fifth International Veterinary Congress to convene is near at hand. We have on various occasions called the attention of American veterinarians to this important event, and have often expressed a hope that representatives from some of our State or national societies might be found among the delegates. This, in our view, is a matter which ought not to be overlooked by American veterinarians. We have been requested by both Inspector General Chauveau, the President, and Professor E. Nocard to remind our American colleagues of the date of the meeting, with the business to be transacted by the Congress, and it is with pleasure that we comply with their suggestions, and once more urge our friends not to miss the splendid opportunity which again occurs, of meeting and hearing some of the celebrities of our profession. The following resolutions were adopted by the Committee of Organization at their last meeting:

1. The universal (international) exhibition of horses (breeders), which will take place in Paris from the 1st to the 10th of September, being certain to attract the attendance of a large number of veterinarians, the International Veterinary Congress will consequently hold their meetings from the second to the eighth of September.

2. The meetings will be held in the hall of the Society of Geography, 178 Boulevard Saint Germain.

3. The assessment (cotisation) is fixed at 10 francs (2 dollars) entitling the subscriber to all the publications of the Congress.

4. Subscriptions (adhesions) and assessments (cotisations),

must be forwarded before the 15th of August to M. Capon, Treasurer, 193 rue de l'Universite, Paris.

5. ———

6. During the Congress the inauguration of Henri Bouley will take place at the Alfort School.

The following questions will be treated: 1. Tuberculosis; 2. International Sanitary Service; 3. Indemnities in all cases of Slaughtering; 4. Prophylaxy of Contagious Pleuro-Pnenmonia; 5. Inspection of Meats—questions of far greater interest and practical importance to nations and to communities in general than nine-tenths of the political and economic subjects which consume the time of the congresses and parliaments of the world at large.

INOCULATION AND PLEURO-PNEUMONIA.—A considerable period has elapsed since the prevalence of pleuro-pneumonia amongst the cattle of some of the eastern States was made an object of official attention, and excited more or less inquiry in popular, as well as professional circles. At the present time we believe we are wholly dependent for any knowledge which we may possess on the subject, upon such reports and movements of the Bureau of Animal Industry and its various sections as may be accessible, and if there are any interested parties who would like to be informed on the subject, or to inform others, we fear that they would become badly embarrassed were they called upon to answer the question: "How is the work of the 'stampers out' progressing?" So little is known upon the subject of this important work that whether any permanent results have been so far certainly secured, must remain, we fear, but little more than a mere conundrum, for the eastern States at least. About the only facts of which we are reasonably sure relate to the numerous official changes which have taken place of late, and, if we are not wrongly informed, which are soon to be followed by more. Efficient officers have succeeded each other quite rapidly, with their uncompleted work cut short by dismissal or by (perhaps a forced) resignation, only to see new appointees put in their places, who may have the same prospect to contemplate and so on, until—what! Too probably the elevation of some unworthy aspirant or favorite who may

rise to the leading post and make a political job out of what once was, and always ought to be, considered a strictly professional labor.

The result is a serious one from various points of view. First, and of first importance as we consider it, and most interesting to us, is the professional, since a failure in the work, through incompetency, will be sure to lower the estimation of the veterinary profession in the popular mind for years to come. Secondly, from the point of view of agricultural losses and prospective dangers. If pleuro-pneumonia cannot be stamped out within the limited bounds that it occupies at the present time, what will be the next measure to adopt against its ravages? And it is then that the subject of preventive inoculations will come forward, and that its advocates and its opposers will have an opportunity to discuss the subject some more.

On this account anything relating to that operation must always be of interest. The letter of the Chief Inspector of Stock of Australia, throws a good deal of light on the subject, and deserves our close attention and a wide promulgation. With the *Breeders' Gazette*, from which we copy it, we will say again, as we have always said: Where the disease has once gained an extended foothold, inoculation may be advisable, but when it is confined within narrow limits, as has been the case thus far in this country, a war of extermination is the only sure expedient for conquering it.

The letter reads as follows:

*To the Gazette:*

It will interest many of your readers to know that the Government of this colony, taking advantage of the presence in Australia of Dr. Germont and Mr. Loir—two representatives of M. Pasteur—concluded an arrangement with these scientists—with M. Pasteur's consent—to conduct a series of experiments here with a view to discovering means of cultivating or preserving the virus of bovine pleuro-pneumonia for inoculation purposes.

It may be explained that twenty-seven years' experience of the practice has fully convinced Australian cattle-owners of the efficacy of inoculation as a prophylactic; but hitherto cattle-owners have been unable to procure virus for the purpose until the disease had actually penetrated their herds, or until the contiguous herds had become infected. It was to overcome this difficulty that the Government, urged by the cattle-owners, completed arrangements with the French scientists to conduct the experiments referred to. How thoroughly they

have carried out the experiments so far will be gleaned by the enclosed clipping from the *Brisbane Courier* of this morning, containing a report of the proceedings of a demonstration yesterday, at which a number of the leading cattle-owners, medical gentlemen, and the Government veterinarian attended by invitation to witness the results of the experiments and observations of the scientists. A laboratory was fully equipped for the scientists; containing all the last and most improved appliances connected with the microscope; sterilizers, incubators, etc., etc., and they were provided with as many calves as the nature of their experiments required.

The results of the experiments so far may be summarized as follows:

1st. That it has been demonstrated that inoculation is a sure preventive of pleuro-pneumonia.

2d. That a minute quantity of virus, say two drops, inserted under the skin, behind the shoulder of a calf, will in most cases result in the death of the calf about the twenty-first day, and that in the cells under the skin on the inoculation side there will be found sufficient pure lymph to inoculate from two to three thousand head of cattle.

3d. That this lymph—even to the third, fourth, or more cultivations—is purer and equally as virulent as lymph from an animal that had contracted the disease in the natural course.

4th. That this lymph is that of the true bovine pleuro-pneumonia is proven by the fact that the scientists failed to impart the disease to goats, guinea pigs, fowls, etc., although injecting in them the same quantity of the same lymph which proved fatal in calves.

5th. That all the calves inoculated behind the shoulder—whether with original virus from a case naturally contracted, or with lymph that had passed through calves successively to the third and fourth generation (or cultivation)—presented the lesions of true bovine pleura-pneumonia.

As I notice that inoculation for pleuro-pneumonia is not in favor in America, will you permit me to state two facts in connection with the practice in Australia:

1st. We have in this colony an act providing for the registration of brands and ear-marks on cattle, which is administered by me. Under that act I set apart a particular ear-mark—namely, a piece cut “square” off the right ear—as an “inoculation ear-mark” to be used to distinguish inoculated from uninoculated cattle, and to be used *for no other purpose* under a penalty. The percentage of deaths among cattle bearing the “inoculation ear-mark” have been very trifling, while heavy among those cattle surrounding them and mixing with them that have not been inoculated.

2d. As there are nearly five millions of cattle in this colony (Queensland), to a population of 320,000 souls, by far the larger majority of our cattle are traveled to the other Australian colonies and sold as stores. So great is the faith of the Southern graziers in the efficacy of inoculation—a faith built up on many years experience—that inoculated cattle will always command a price of from fifteen to twenty per cent. more than uninoculated ones. Thus the “inoculation ear-mark” has acquired a commercial value of from ten to fifteen shillings per head.

P. R. GORDON,  
Chief Inspector of Stock.

BRISBANE, March 9, 1889.

HOG CHOLERA.—The Government at Washington, through the Department of Agriculture, has been for a number of years conducting a series of scientific investigations on the subject of this scourge of the swine family, which has been for a long period and is still causing so much pecuniary loss in the various States where it prevails, and during this period various successive reports from Dr. E. Salmon, the official veterinarian of the Department, have recorded the progress which has been accomplished. These reports being, however, occasional and isolated, and only published at intervals, failed to present the results of his investigations in a consecutive and orderly form and it became difficult for those who were interested in the subject to form a clear conception of the work accomplished as a symmetrical whole. To remedy this difficulty, the Chief of the Bureau of Animal Industry has now collected and collated the several reports into book form, in a volume entitled "Hog Cholera, Its History, Nature and Treatment," and the student of the subject will be no longer obliged to search among fragmentary reports for the information of which he may be in quest. The most important of the results which have been reached may be thus summarized:

1st. The disease is a contagious and infectious one, and may be contracted by a healthy hog from a diseased one, or from infected premises, and the contagion may be carried from farm to farm in various ways.

2d. It is a bacterial disease, the germ having been first accurately figured and described in 1886, and studied almost constantly since that time.

3d. The germ is readily cultivated in various media, is transmissible to other animals than hogs, from which it may be retransmitted to swine and produce a fatal form of the disease.

4th. A fatal disease similar to hog cholera, which has been named "swine plague" to distinguish it from the disease first met with, was discovered during the progress of these investigations. It is also a germ disease, widely distributed and fatal, and may exist as a complication in outbreaks of hog cholera.

5th. The disease may generally be prevented by isolation of the animals and by cleanliness combined with simple measures of disinfection.

6th. Outbreaks of hog cholera are to be checked by separating the well from the diseased animals and practicing disinfection.

7th. Infected premises may be made safe for the admission of a new herd by disinfecting with lime or other disinfectants, and allowing three to six months to elapse after the disease has disappeared.

8th. Medicines have not been found to greatly influence the course of the disease.

9th. Inoculation has been tested in almost every form as a preventive without satisfactory results.

10th. Hog cholera is apparently identical with a disease which has recently been described in various parts of Europe.

These conclusions are all based on the investigations conducted by the Bureau of Animal Industry.

VETERINARY LEGISLATION.—We have hitherto, as occasions have occurred, kept our readers informed of the provisions of the bills which have been introduced before the Legislatures of the various States relating to the protection and regulation of veterinary practice. In this manner our friends have become acquainted with the various enactments which have thus far been perfected, and which must in due time, if faithfully administered, result in the extirpation of empiricism and quackery in the practice of comparative medicine. We take pleasure in announcing in our present number the passage of the bill presented to the Legislature of Pennsylvania, the text of which we printed some time ago, and we accompany it with the text of the two bills which have been signed by the Governors of New Jersey and of California. Much may be learned by the veterinarian who will carefully study the provisions contained in these enactments, all of them aiming, as they do, to bring about similar results, though varying in the manner of securing them. That any of them are perfect will not be expected, but that they all contain provisions from the enforcement of which the veterinary profession may largely take advantage and greatly profit, cannot be doubted, and it is to be hoped that no one will decline to accept the good which is obtainable from their operation because some desirable benefit may have been undesignedly left unprovided for. This would be but poor philosophy at the best, and, moreover, that which may have been overlooked now, may still be secured at some future time, and the comprehensive and uniform legislation, which is the thing most needed, become at length an actual and accomplished fact.

Notwithstanding the imperfection of these laws, we may fitly congratulate ourselves on their enactment, and may in fact consider them, even in their present form, as an advance upon some of those that are yet to come in old Continental Europe.

FALSE RABIES DUE TO WORMS.—*Lyon Médical* gives a summary of an article in the *Journal des Connaissances Médicales*, by Dr. A. Silvestrini, in which the author states that he has observed several cases of disease in dogs, especially hunting dogs, in Tuscany, infested with the *Strongylus gigas*. Among the symptoms is a disposition to bite, the animal avoids the light, its mouth is red and frothing, its voice is hoarse, and its gait is vacillating. Its expression is that of suffering, rather than of ferocity. The condition is somewhat difficult to distinguish from rabies, but the occurrence of hæmaturia, from the lodgment of the parasite in the urinary passages, establishes the diagnosis. The disease is fatal, except in the rare cases in which the worm is expelled by the urethra.

## ORIGINAL ARTICLES.

### ÆTIOLOGY OF TUBERCULOSIS.

By DR. R. KOCH, Privy Councillor.

(Translated by Rev. F. SAURE.)

(*Transactions of the Massachusetts Veterinary Medical Association.*)

(Continued from page 82.)

5.—Boy of eight years. Caseous bronchial tubes, numerous miliary tubercles in the lungs, spleen, liver and kidneys. The little knots of the lungs were thoroughly provided with large nucleusless caseous centres, and on the circumferential parts of the same, single little groups of bacilli were to be found. Tuberculous bacilli could also be proved in some giant cells on the border of the caseous centers. Bacilli-bearing giant cells were also to be found in the spleen. In this case I did not succeed in finding bacilli in the little knots of the liver and kidneys. On the contrary they were abundantly present in little nests in the bronchial glands.

6.—A strongly built and vigorous man, thirty-four years old, had suffered from a cough for about three weeks before his entrance into the hospital. Quite high fever and broncho-pneumonia symptoms, cerebral phenomena soon appeared, and by means of the ophthalmoscope, tuberculosis of the choroidea could be clearly shown. Death followed fourteen days after entrance to the hospital. Caseous confluent herds in the tips of both lungs, quite large, not very thickly sown miliary tubercles in the lungs, spleen and liver, bronchial glands caseous. In the little knots of the lungs tuberculous bacilli found singly in the periphery.

Liver and spleen contained giant cells, among them some with bacilli. In the bronchial glands also, small groups of bacilli could be shown only in a few spots.

7.—Baker's apprentice, seventeen years old, anæmic, of a delicate build, had coughed for half a year, was taken into the hospital with a pleuritic exudation from the right side. Puncturing the thorax brought out 500 ccm. of clear serous liquid. Four weeks later cerebral symptoms appeared, and after another two weeks death followed. Dissection showed tuberculous pleurisy, miliary tuberculosis of the lungs and tuberculous meningitis. In the little knots of the lungs, as also in those of the pia mater, tuberculous bacilli were found and in some places very abundantly.

8.—Six-year-old girl. Bronchial glands and partly verkalkt (ossified.) Single lobuläre (lobular, lobe-shaped?) red, hepatized herds in the lungs, within which the bronchiæ were supplied with purulent contents. At the base of the brain muddy "sulzig" infiltrations of the pia. Numerous miliary and sub-miliary knots in the vessels of the fossa Sylvii. Microscopic examination showed tuberculous bacilli in small numbers in scattered spots in the bronchial glands. In the hepatized parts of the lung the alveoli were found filled with bacteria of various sorts. (aspirations pneumonia). The meningeal tubercles were very abundantly supplied with tuberculous bacilli.

9.—Workman thirty-four years of age, drunkard, treated two years before on account of scrofula of the wrist bones. Complication with "lymphangitischen" (pertaining to inflammation of the lymph vessels) abscesses on the upper part of the left foot and upper part of the thigh. Death, with cerebral symptoms, after seven weeks' stay in the hospital. The dissection showed caseous infiltration with formation of cavities in the tips of both lungs, miliary tubercles in both lungs and at the base of the brain. Quite numerous tuberculous bacilli were found in the tubercles of the lungs as well as in the meningeal tubercles.

10.—Five year old boy. Wide-spread caseous degeneration of the bronchial glands. In the tip of the left lung a caseous herd larger than a hazel nut, with the centre in a state of disorganization. A moderate number of comparatively large miliary tubercles in the lungs. Quite numerous grey and yellowish little caseous knots in liver, spleen and kidneys. The pia mater of the basis of the brain greyish, yellow "sulzig" infiltrated. Under microscopic investigation numerous tuberculous bacilli were found, partly enclosed by giant cells, in the bronchial glands; also great heaps of bacilli in the tubercles of the brain membranes. In the little knots of the lungs, liver, spleen and kidneys only comparatively few bacilli were present.

11.—A one-year-old child very much afflicted with atrophy, said to have been taken sick with a cough eight days before its arrival at the hospital. The bronchial symptoms and dyspnœa which showed themselves in the first examination, increased, and the child died two and one-half weeks later. The right upper lobe of the lung was found to be caseously infiltrated, bronchial glands caseous. Numerous miliary tubercles on the peritoneum, on the diaphragm and in the spleen. Tuberculous meningitis. In the meningeal tubercles numerous tuberculous bacilli. Nests of bacilli in the caseous parts of the lungs and in the bronchial glands. Scattered bacilli in the tubercles of the peritoneum and diaphragm, exclusively enclosed in giant cells. A moderate number of bacilli in the tubercles of the spleen.

## Q.—PHTHISIS OF THE LUNGS.

Twenty-nine cases were examined and the tuberculous bacilli were wanting in none of them. The number of bacilli, to be sure, varied greatly, but one could recognize here as in miliary tuberculosis, in so far a connection between the number of the bacilli and the phthisic process, that the bacilli were found most abundantly in fresh caseous infiltrations and in the interior of cavities whose environment was in a state of rapid decay. The bacilli were found less abundantly in the cavities provided with compact, callous walls; they were most scarce in scarred, shrivelled lung tissues containing much pigment. The more their number decreases the more they confine themselves to the interior of the giant cells. One may not conclude, however, that each single case conducts itself throughout in a like manner in regard to bacilli, that one phthisic lung shows throughout a great number of bacilli, another, on the contrary, only scattered ones. To be sure it may sometimes be so, but it will usually be found that in the same lung some parts are entirely free from bacilli, but that in single spots dense nests of the same are present. So especially may cavities of some extent appear almost or wholly free from bacilli, until, by continued investigation, one suddenly finds one or more nests of tuberculous bacilli in a hidden side indentation or encamped close beside the wall of the cavity, but not yet melted into it, and finds them, too, so thickly crowded together that even under a low magnifying power they appear as dark blue spots. For the examination of phthisic lungs it follows that one may not content himself with looking through a number of sections from any one spot, for example from a piece of the wall of a cavity, but should examine as great a variety of places as possible, and should take not too small a number of specimens from each. Only so can one get a correct conception of the behavior of tuberculous bacilli in the case in question.

After the experience gained in my investigations I should represent the relations of the bacilli to phthisic processes in the following manner: In the beginning only a few, or single bacilli get into the lung, and on account of their slow growth are very soon enclosed by a cell infiltration and thereby hindered from forcing themselves more quickly into the surroundings of the infectious spot. The bacilli, nevertheless, do not perish in the cell infiltration, but cause necrosis and caseous degeneration in the centre of the cell mass just as in miliary tuberculosis. The first beginning of phthisis would, if one could succeed in getting a sight of it, completely resemble a miliary tubercle. The little knot gradually takes larger dimensions and becomes constantly more unlike the miliary tubercle. An analogy of this stage might be found, however, in the not rarely occurring cases of large solitary tubercles, which do not always appear solitary but also scattered to a certain extent in various organs. These also I would consider as having proceeded from single miliary tubercles whose number is so small that they do not bring about the immediate death of their bearer, as is the case in general miliary tuberculosis, but which rather gain time for farther growth, and can finally grow to caseous herds of a good size. It is quite certain that the phthisic process takes the same development, that, namely, proceeding from a little miliary knot there grows a constantly spreading caseous herd. In the lungs the relations shape themselves very peculiarly, because the increasing caseous herd does not remain closed,

but after a shorter or longer time makes its way into the bronchiæ, empties itself and so is changed into a cavity. The further increase of the cavity goes on in a very irregular manner according as the process of vegetation in the tuberculous bacilli makes a halt in single places for a shorter or longer time, or continues, and according to this indentations or shrivelling are formed in places. Taken in general, the cavity, however large or irregular formed, retains the essential properties of the tuberculous caseous herd; necrotic masses in the interior, joined to these towards the outside nests of epithelioid cells with gigantic cells sandwiched in, and in the giant cells often tuberculous bacilli. An exception occurs only in so far as the tuberculous bacilli in the cavity appear in comparative abundance also in the interior of necrotic masses, which in the caseous herds remaining permanently closed is not usually the case. Probably this has its foundation in the fact that the masses dead, and to a certain extent used up as a breeding-ground for bacilli, are constantly being emptied, and the parting of the walls of the cavity give constantly a new food material for bacilli.

In this manner the usual chronic form of phthisis would run its course. In this usual course the vegetation of the bacilli is a very slow one and the occurrence of the bacilli very sparse, and essentially confined to the giant cells in the immediate surrounding of the cavities and to the contents of the same. The circumstance is very noteworthy that even in comparatively small tuberculous herds the growth and dispersion of the bacilli is not uniform but discontinuous. In large herds, and especially in larger cavities, this behavior, which has already been touched upon, is always more striking. Widespread spaces of the cavity may be wholly free from bacilli and sometimes the bacilli may be confined to single spots of very slight extent. From this we may conclude that the conditions of life for bacilli in a tuberculous herd are not everywhere equally favorable, and probably also in regard to time may be subject to fluctuations. The bacilli must then vanish from the places which no longer give them suitable breeding-ground. In this case at one time only a temporary freedom from the parasites can take place, when the bacilli from the neighborhood later force themselves in or if spores have been left behind which may develop under more favorable conditions. At another time a lasting freedom of the diseased spot from bacilli can take place when the just mentioned conditions for the reviving of the bacilli vegetation do not occur. Shrivelling, scarring and healing will follow then in such a place. One can think that since these things may take place partially in the periphery of the tuberculous herd, the same might happen in the whole compass of the herd, and so a complete healing take place. Analogous relations are found in other diseases conditioned upon bacteria which also spread themselves out centrifugally from the original spot of infection, but can show in their progress considerable irregularities sometimes cease to grow at one point, sometimes thrive and spread rapidly, as is the case, for example, in erysipelas.

The development of a single tuberculous herd running its course in the lung under the type of chronic phthisis can be complicated in many ways, if the tuberculous bacilli in any manner get out of the reach of the original herd into other places and there give rise to the development of secondary

herds. This proceeding can complete itself in various ways. The bacilli can get into the larger blood vessels of the lungs, be strewn over the whole body in greater or lesser numbers by the course of the blood and cause miliary tuberculosis. Then, according to all appearance, the bacilli have the power of spreading themselves also by way of the course of the lymph, of forcing themselves into the bronchial glands and causing secondary tuberculous changes. The bacilli conveyed from the cavities into the air passages find by far the most frequent opportunities of fixing themselves in other places. Oftentimes they nestle themselves in other parts of the air passages and more especially into the larynx. Often if the sputum be swallowed they plant themselves in the intestinal passage.

The usual course of the phthisis must then be most affected when the bacilli-bearing pus from the cavities is on the way to be conveyed outward by the bronchiæ, but by some unfortunate disturbance of the motions of respiration is again aspirated and brought into parts of the lung until then healthy. When only a slight quantity, poor in bacilli, is aspirated, it can only bring about the beginning of a comparatively small number of infectious herds. These will gradually grow and develop into cavities according to the place that the bacilli-bearing masses reach, sometimes in the immediate neighborhood of the mother herd, sometimes some distance from it, even in the other previously healthy lung, and will from small beginnings grow just as slowly as the first tuberculous herd. But as soon as considerable quantities of the bacilli-rich contents of the cavities are breathed in, and wide-spread parts of the lung are overflowed, as it were, with infectious material, as appears not seldom to be the case, then the formation of single tuberculous knots is not the first step, but tuberculous infiltrations arise which show us by the lobed and even lobuled (*lobuläre*) arrangement that they came from the respiratory passages. The penetration of the tuberculous bacilli *en masse* has not as a consequence heaps of closed cells and the formation of giant cells, as is the case when individual bacilli appear, but necrosis of the component parts of the cells in the attacked tissue spreads widely and with comparative quickness. In consequence wide-spread caseous degenerations form in many places, also rapid dissolution of the tissue, with development of cavities which bear another character than those formerly described.

While these cavities possess compact, firm walls in which are found giant cells and scattered tuberculous bacilli, the walls of cavities formed in the decomposing and widely caseous lung tissue are permeated by a thick bacilli vegetation. They do not consist of condensed callous tissue, which only melts away slowly under the influence of the bacilli, but the wall allows us still plainly to recognize the structure of the alveoli which are filled with the caseous substance rich in bacilli, but are in the act of losing their coherence, and falling to pieces. These conditions are usually described as caseous pneumonia, acute phthisis, etc.

The most various combinations of these two just described processes, that of a tuberculous herd proceeding from a single infectious herd and spreading slowly, and the caseous infiltrations arising from a flood of infectious material, unite to give a most varied conception of the tuberculous destruction of the lungs covered by the general name phthisis.

It deserves still to be mentioned that the aspirated masses giving rise to caseous infiltration do not necessarily always spring from a tuberculous herd of the lung. Several recorded observations of animals are at my disposal which prove that a caseous ulceration of the tonsils, or a tuberculous ulcer on the superior margin of the lower jaw, which had developed itself in a rabbit in consequence of a bite, also in one case a caseous bronchial gland communicating with the air passages, can furnish the bacili-bearing masses which are breathed into the lungs. On this account therefore, also in man, tuberculous processes in the larynx, throat and mouth, as well as caseous bronchial glands, so soon as the latter empty their contents into the bronchiæ, are to be kept in sight as points of departure for caseous infiltrations of the lungs.

The conduct of the secretion of tuberculous lungs, the phthisic sputum, deserves special consideration. Since tuberculous bacilli occur in no other diseased conditions than in the tuberculous, the demonstration of their presence has great diagnostic importance. The first examinations which I made of phthisic sputum led to the result that abundant numbers of bacilli showed themselves in the sputum in half the cases examined; in other cases only a few bacilli were to be found, and in many they seemed to be wanting. But when I used Ehrlich's color treatment, and had had more practice among the by no means few cases examined, not one case more occurred in which the bacilli were wanting. I do not mean to say by this, that in single cases, after repeated investigation one may not fail to find bacilli, but in general it must be considered a settled fact, on account of the numerous results in the mean time published also by other investigators, that the bacilli, with few exceptions, constantly occur in phthisic sputum, are wanting in the sputum of other lung diseases, and thereby give an unmistakable diagnostic characteristic mark of the presence of tuberculous affections of the lungs.

The bacilli often occur in the sputum in quite considerable numbers. Apparently these are always cases in which there is rapid dissolving of the caseously infiltrated parts of the lungs, and in which the cavity walls have mixed their secretion with the sputum. The well known caseous fragments which from the beginning have been considered as a specially characteristic component part of phthisic sputum, consist almost wholly of masses of bacilli. One can think that these caseous fragments have arisen from compact bacilli masses, such as are sometimes found on the inner wall of the cavities, becoming loosened, and swept away by the secretion of the cavity. Nevertheless, one often meets cases in which the sputum is very poor in bacilli, and must look through a number of specimens, indeed sometimes must repeat the investigations for several successive days before he succeeds in discovering bacilli. The sputum investigations carried on for a long time by Gaffky with a number of phthisic patients, which are published in this volume of the "*Mittheilungen*" give the best idea of the frequency of bacilli in phthisic sputum.

Very often the bacilli occurring in the sputum are spore-bearing, and this appears to be especially the case when the bacilli could develop themselves unhindered and abundantly, as is the case in caseous infiltrations. Just these relations are of the greatest importance for the ætiology of tuberculosis, and we shall come back to them later.

Since the sputum is always more or less mixed with saliva, it contains regularly, beside the tuberculous bacilli, other sorts of bacteria, the abundance and variety of these depending upon the amount of saliva and mucus from the cavity of the mouth mixed with it.

If sputum is kept for some time in a vessel the tuberculous bacilli remain unchanged, both in reference to their number and to their responsiveness to coloring matter. The other bacteria, on the contrary, increase rapidly in numbers, other bacteria coming from the air or accidental defilement, appear, and a real decay develops itself very soon. Under microscopic investigation one finds, then, numberless bacteria occurring in the fresh sputum out of the cavity of the mouth, or those appearing in decaying sputum, which act in regard to color like the tuberculous bacilli. The latter always keep their intense blue color if the coloring is carried on according to the rule, while all other bacteria appear dyed brown.

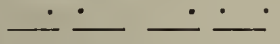
It is still to be mentioned that sometimes bacteria force themselves also into the cavities, and can increase in their secretions so that, in these cases, one finds in the contents of the cavity not only tuberculous bacilli, but other bacteria. I concerned myself, nevertheless, in the few cases over which my observations of this sort extended, only with certain sorts of bacteria, so one need not suppose that a sort of decay in the contents of the cavity, as in the sputum exposed to the air, existed, but it must be assumed that of the various sorts of bacteria which accident had brought into the cavities, only certain definite kinds can thrive there. These then either lead a harmless parasitic life in the contents of the cavity, as for example, the bacteria of the green pus, which I have repeatedly found in large old cavities, or they, as it seems, take part in the destructive work of the tuberculous bacilli, as seems to me to be the case with a special sort of micrococci. The latter distinguish themselves by a peculiar arrangement, almost regularly forming groups of four, and have on that account at first sight a certain resemblance to sarcine, nevertheless in other ways distinguishing themselves essentially from these. Gaffke has studied the properties of these further\* and found that they are disease-producing for many species of animals. Also, in the case in which they were first discovered, they appear to have aided in the quick destruction of the lung tissue. It is much to be wished that in future attention should be paid to these combinations of phthisis, because they must lead to the finding of such sorts of bacteria as of themselves possess no or only conditional disease-producing properties for the human organism, but under conditions specially favorable to them, as for example in an ulcerous herd of the lung, can form little nests and have a decisive influence on the further course of the process. Of how much importance such secondarily-working bacteria may be has already been mentioned in the description of miliary tuberculosis and the mixed infection occurring there.

In connection with phthisis of the lungs, some remarks may here find place in regard to the phthisis of the intestines. Among the twenty-nine cases which I had the opportunity to examine, I received in addition to parts of the phthisic

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\*Langenbeck's Archiv., Vol. 28, Book 3.

lung also, in eight cases pieces of the intestinum tenue with tuberculous ulcerations, and just as often caseous mesentric glands. Several times the abscesses of the intestinum tenue were surrounded by fresh tuberculous eruptions, which followed the lymph-passages.

The growth of the bacilli appears, at least so far as we can come to a conclusion from the material at my disposal, to find more favorable conditions in the intestines than is usually the case in the lungs. It should not therefore surprise us if, in the excrement of a person suffering from phthisic and tuberculous abscesses, tuberculous bacilli occur in comparatively large numbers, as Lichtheim first discovered. Among the numberless and very largely staff-formed bacteria of the intestinal contents the microscopic proof of tuberculous bacilli would have proved itself as good as impossible, if it had not been for the specific tinctorial properties of the latter, which just in this case proved themselves especially useful. Since from several sides the certainty of the proof of tuberculous bacilli in intestinal excrement has been doubted, I urged Dr. Gaffky to undertake a number of investigations. These showed that neither in the excrement of healthy persons nor in those of sick ones, who were not suffering from tuberculous diseases, any sort of bacteria were found which gave the same sort of color-reaction as the tuberculous bacilli. Also in the case of all persons afflicted with phthisis, who were examined in regard to it and who had tuberculous bacilli in the sputum, it was impossible to prove such in the excrement, but they could regularly be shown in such patients when they had plain symptoms of ulcerous disease of the intestines. One observation made by Gaffky during these investigations deserves special mention. Namely, in the contents of the intestines there not seldom occur large spore-bearing bacilli, whose bodies, like those of all other bacteria, take the brown color, while the spores remain colored more or less intensely blue. The spores appear to be more darkly blue the younger they are. When the body of the bacillus perishes and the spore alone remains, since in size it resembles a large micrococcus, it can easily be mistaken for one at first sight; especially when several spores lie near together they can be very similar to a little heap of large micrococci. Probably, therefore, the formations described by Lichtheim as blue-colored micrococci are identical with these spores. But it appears that other bacilli occurring in the intestines form spores, which by Ehrlich's color-treatment keep the blue color, for Gaffky found in the excrement of a tuberculous monkey, beside tuberculous bacilli, bacilli of still larger dimensions than those just mentioned. These had not egg-shaped, but very long-extended, almost staff-shaped, spores. The spores were fixed in the ends, and in bacilli of more than one member so arranged that in two neighboring members the spore-bearing ends were turned towards each other and followed in the manner indicated here:  The points are spores, the lines bacilli-members, a peculiar arrangement of the spores to which I on another occasion have already drawn attention.\* The spores of the anthrax-bacilli, hay and potato bacilli were also tried by Ehrlich's color-method and did not show the reaction, but it is nevertheless very probable that still other sorts of bacilli-spores act

\*F. Cohn's Beiträge zur Biologie der Pflanzen. Vol. 2, Book 3.

tinctorially as the sorts described, and that with the help of aniline reaction one would be able to distinguish these sorts of bacilli easily from others. The animal in which the bacilli with staff-shaped spores were found, died and had, as the dissection showed, beside numerous tubercles in the lungs, spleen, etc., several tuberculous abscesses in the *intestinum tenue* abundantly supplied with tuberculous bacilli.

From the cases of phthisis examined I will speak of a few which served as points of departure for inoculation and for the culture of tuberculous bacilli.

1.—A woman of thirty years, whose mother also died of phthisis, suffered for half a year from cough with expectoration. Great loss of flesh. Occasionally slight fever. Death after three months' stay in the hospital. Dissection showed left lung partially deformed as well the upper as the under lobe containing a number of communicating vomicae. Right lung also deformed, containing a large baylike vomica in the upper lobe and several smaller ones in the middle lobe. Spleen, liver, kidneys free from tuberculous changes. Under microscopic investigation only a moderate number of bacilli were found in the contents of the vomicae. In the surroundings of the vomicae, which had compact walls, were giant cells grouped around little nucleousless herds and largely supplied with tuberculous bacilli.

2.—Man twenty-three years of age. His mother said to have suffered from phthisis. Had been in the hospital the year before on account of pleurisy. In the last few months repeated hæmoptisis. Besides this diarrhoea. At his reception into the hospital thin, anæmic. Suffocation and bronchial breathing over the point of the right lung. Cough with purulent expectoration. Death after four months. In the right lung large vomicae with partly callous, partly caseously infiltrated walls. On the vocal chords tuberculous ulcerations. Beginning amyloid degeneration of the spleen. Numerous abscesses in the intestines, swelling and caseous degeneration of the mesenteric glands. Also in this case the tuberculous bacilli were present in comparatively small numbers in the contents of the vomicae and in the lung tissue, but, on the contrary, were very numerous at the base of the intestinal abscesses and in the caseous mesenteric glands.

3.—Workman of forty-three years, quite strongly built. No heredity could be proved. Had suffered for three months from cough, expectoration and increasing weakness. Of late his troubles, especially dyspnœa, had grown much worse. Death after twelve days' stay in the hospital. In the tips of both lungs vomicae of moderate size, wide-spread caseous infiltration with occasional softening and formation of vomicae in the middle and lower parts of the lung. Ulceration in the larynx. In the vomicae as well as in the caseously infiltrated lung tissue, bacilli were found in great quantities.

4.—Man of thirty-two years, not hereditarily burdened. Said to have been sick only four weeks. At his reception into the hospital anæmic, emaciated. Death after six weeks' stay in the hospital. In both lungs numerous vomicae of varying size whose surroundings for a considerable distance were caseously infiltrated. Some smaller vomicae lay near the surface and showed as slight protuberances. These were used to obtain rein culture.

5.—Servant girl of nineteen years ; mother died of phthisis ; had suffered for a year from cough ; of a delicate build, short breathed and had profuse sweats. Death after seven weeks' stay in the hospital. In the left upper lobe of the lung a moderately large vomica. The remaining part of the lobe infiltrated and lobular? (lobuläre) caseous herds, close together, partly with central decay. On the right almost the whole lung infiltrated with greyish yellow caseous masses and with many softened spots. In the trachea flat ulcerations. In the ileum and in the beginning of the colon numerous abscesses with indented borders. Mesentric glands partly freshly caseously infiltrated. As well in the interior of the vomicæ as in the caseously infiltrated parts of both lungs extraordinary numbers of bacilli were found, mostly heaped together in nests. Also in the intestinal abscesses and mesentric gland tuberculous bacilli were present in considerable numbers.

### 3.—TUBERCULOSIS OF VARIOUS ORGANS.

The cases of tuberculosis examined by me to be mentioned under this division concern single organs which have been obtained, partly from operations, partly from sections, without my knowing anything further of the course of the disease or of the other results obtained from the sections. I can on this account only mention them summarily here.

Two cases of tuberculous abscess of the tongue. At the base of the abscesses and in places forcing themselves deep into the tissue of the tongue, thick swarms of tuberculous bacilli were found.

Tuberculous bacilli were just as abundantly present in four cases of tuberculosis of the pelvis of the kidneys, in one case of tuberculosis of the bladder and of the urethra, once in tuberculosis of the surenal gland, and in a case of tuberculosis of the uterus and of the tubi.

On the contrary, the number of tuberculous bacilli was very small in five tuberculous testicles removed by operations. They could only be proved here singly in the numerously present giant cells.

Just the same behavior showed itself also in two cases of large solitary tuberculous herds of the brain. The appearance of the bacilli here also confined itself to the giant cells.

The only case belonging here in which no tuberculous bacilli at all could be proved concerned the examination of pus which came from a tuberculous abscess of the kidneys. Inoculation with this pus had given a positive result, therefore infectious germs must have been present in the same. We shall speak of this case later and give explanation for the negative result of the microscopic examination.

### 4.—SCROFULOUS GLANDS.

The scrofulous glands which I have examined I owe for the most part to Privy Councillor Badeleben, who placed the same at my disposal directly after they were removed. Twenty-one cases in all were examined in which the glands showed themselves tuberculous. I understand by this the presence of epithelioid cells which are grouped in herds and enclose more or less numerous giant cells. With few exceptions, in which a necrosis and caseous degeneration of the diseased gland tissue had not yet appeared, these cells were

joined directly to the caseous herd present, and formed the immediate surrounding of the same. Only in glands which possessed a tuberculous structure of this sort could tuberculous bacilli be proved. In a number of cases, on the contrary, in which the glands were enlarged, partly also softened, and thoroughly impregnated with herds of pus, but in which epithelioid and giant cells as well as the characteristic necrosis of the tissue were wanting, no bacilli were found.

The tuberculous or scrofulous glands examined belonged to twenty-one different patients. Of these eleven were between the ages of ten and twenty years, seven between the ages of twenty and thirty, one each thirty-seven, thirty-nine, and three. The glands had been situated fifteen times on the neck and in the submaxillary region, three times in the back of the neck, twice in the axilla, and once in the region of the cubitus. In the last case, that of a three-year-old boy, there existed at the same time caries of the wrist on the same side. In three cases there had been a relapse after the first operation, and this had caused a second excision of the glands. In several cases it was stated that phthisis was hereditary in each family.

In general the tuberculous glands in reference to their contents of tuberculous bacilli were very uniform. In the interior of the caseous herd I have found the bacilli only in two cases, and even here only individual specimens. The bacilli appeared only exceptionally and individually between the epithelioid cells. On the contrary, among the giant cells there were always some, occasionally many, which contained one or two tuberculous bacilli. Giant cells with a larger number of bacilli, as one so often finds them in bronchial and mesenteric glands, I have never been able to find in scrofulous glands.

In the three cases in which after a time a second gland extirpation took place, the glands twice showed themselves to have the same constitution as in the first examination. The third of these cases which is noteworthy in other respects, was as follows: strongly built man of thirty-four years. A year before large gland tumors had grown on the neck and in both axillæ, and at the same time a high degree of anæmia had developed. In the lungs no tubercles could be shown. The tumors which had been excised had the figure and size of potatoes, were of a soft, almost marrow-like constitution, and without caseous changes in the interior. The microscopic investigation showed that in the swelled mass numberless little herds of epithelioid cells were imbedded, which contained in their midst one or more giant cells. In many of these giant cells one or at most two tuberculous bacilli were found. Very rarely it occurred that one bacillus was situated in the interior of an epithelioid cell, close beside the nucleus of the same. Scarcely a year after the removal of these glands, almost equally large tumors have developed themselves anew on the same spots. These were extirpated again and showed the same microscopic conduct, only with the exception that the number of bacilli-bearing giant cells had decidedly increased in comparison with the previous tumors.

##### 5—TUBERCULOSIS OF THE JOINTS AND BONES.

There were examined by me thirteen tuberculous joints, three hip joints, five knee joints, three elbow joints, one foot joint, and one finger joint; further,

ten tuberculous affections of the bone, thus divided: three times on wrist bones, five times on ankle bones, twice vortex caries (of these last in one case only the pus was examined). To a great extent I owe this material for examination to Privy Councillor Bardeleben.

The granulation-tissue which is formed in the surroundings of tuberculous joints and bones offers no essential difference in the single cases. The same appearances repeat themselves constantly in the structure of the tissue and in the arrangement of the bacilli, and resemble completely the description given of scrofulous glands. One finds just the same more or less scattered and often confluent herds of epithelioid cells which surround giant cells, and also here the occurrence of bacilli is confined almost exclusively to the giant cells. In the caseous, nucleusless spots, as well as in the pus secretions, the attempts to find scattered bacilli only succeeded in some cases. Also in this respect tuberculosis of the bones and joints conducts itself exactly like that of the scrofulous glands.

The bacilli could be proved in all the cases. Only in the abscess pus coming from the vortex caries was it impossible to find tuberculous bacilli. But inoculation with this pus, as was formerly mentioned of the pus of a tuberculous abscess of the kidneys, gave a positive result.

#### 6.—LUPUS.

According to the anatomical investigations of Friedländer and the positive results of inoculation which Hüter and Schüller have obtained, it was to be expected that lupus must also belong to the group of genuine tuberculous diseases. I therefore used the opportunity offered to me by Director Hahn, Prof. Küster and Prof. Lewin, soon after the publication of my first communication concerning the ætiology of tuberculosis, to examine a number of cases of lupus in order to gain certainty in regard to this supposition.

Seven cases of lupus were investigated, which all had the most decided symptoms and were watched for a long time in the hospital, so that no doubt of the correctness of the diagnosis can be entertained. From four cases I received excised pieces of the skin, from the other three cases lupus substance scraped out. For direct microscopic examination only the excised pieces of skin were suitable. In all four cases, though only a few specimens in each, tuberculous were found, only, however, in the interior of giant cells. The tuberculous bacilli are so scattered in the lupus tissue that in two cases the bacilli were not found until from one twenty-seven sections, from the other forty-three sections had been examined. Nevertheless, it happened repeatedly that when in a succession of sections not a single bacillus showed itself, sections followed each other quickly with from 1—3 bacilli. More than one bacillus I have never seen in a giant cell in lupus.

It may for the present be remarked here that of all the seven cases, inoculations were made into the anterior eye-chambers of rabbits, which without exception produced tuberculosis of the iris, and in those animals which were allowed to live for a longer time, general tuberculosis. In these tubercles resulting from inoculation numerous tuberculous bacilli were found. From one case (excised piece of skin from the cheek of a ten-year-old boy suffering from

lupus hypertrophicus) success was obtained in getting renicuturen of bacilli, which have also been used for the successful inoculation of animals.

### B.—TUBERCULOSIS IN ANIMALS.

By the study of the appearances under which tuberculosis runs its course, in the various sorts of animals, the noteworthy fact is manifest that tuberculosis conducts itself differently in the case of almost every species. However striking this fact at first appears, it nevertheless corresponds to the observations made in regard to other bacteria diseases. So, inflammation of the spleen in a similar manner is different in different animals; septicæmie of mice, conditioned upon very small bacilli, offers another example, for when it is inoculated it kills mice, but in rabbits only causes an erysipelas-like disease confined to the skin.

Until now no warm-blooded animal is known which is entirely unresponsive to the infection of the tuberculous virus, and one may therefore expect that many varieties will show themselves in the anatomical aspect of tuberculosis in the various species of animals.

However various the forms which the symptoms of tuberculosis may take in single species, and however little one may be inclined to explain human phthisis and a tuberculosis of a guinea pig caused by inoculation as the same sort of disease, nevertheless between these extremes there are found, partly in the same species, still more in other species, transitional forms of tuberculosis which cause the apparent gulf to vanish. But the complete unity of the tuberculous processes of different species of animals shows itself to be irrefutable when we look away from the constitution of the tuberculous organs as seen by the naked eye, and from the secondary changes in the same, such as caseous degeneration and calcination, and keep to the primary structure of the tubercle, which, as we have already seen, repeats itself with typical regularity in all the various processes in man, and equally so in the apparently so different forms of tuberculosis in the various species of animals. The differences in the tuberculosis of different species of animals which most attract the eye concern only those secondary changes which in the one case lead to wide-spread coagulation-necrosis without caseous degeneration (liver and spleen of guinea pigs); in another to rapid softening and the formation of a thinly liquid, pus-like secretion (tubercle of the monkey); further to transformation into hop-like caseous substance (tuberculosis of man); to simultaneous calcination and caseous degeneration (pearl distemper of cattle); to the formation of hard swollen masses with deposited lime “concrementen” (tuberculosis of the fowl)—and so forth. The primary changes in all these cases are histologically exactly alike. Somewhat the same is true in regard to the formation of pus in various animals. So the pus formed in consequence of a simple inflammation in the rabbit and the fowl has an entirely different constitution than that of man, and yet in this case one would not speak of different sorts of pus formation.

It would lead too far if the special peculiarities of every single kind of animal should be described in detail, and I shall therefore be obliged to confine myself to a brief characterizing of the different forms.

1.—PERLSUCHT OF CATTLE.

The tuberculosis of cattle runs its course, as is well known, almost always by the forming of little knots which do not really become caseous and perish, but become calcareous and heap themselves together in such masses that they can finally form great tumors. But beside these there occur widespread firmly caseous infiltrations of the lung tissue, as well as hollow spaces in the lungs, filled with pap-like caseous masses.

Of the last mentioned form only four cases were examined. The caseous contents of the cavities were of such a consistence that when the cavities were cut the contents could be pressed out in sausage-shaped masses. The cavities themselves appeared to have proceeded from enlarged bronchiæ. In their walls were found quite numerous giant cells, and in a number of these last one to several tuberculous bacilli. The caseous masses were, as the inoculations performed with them showed, infectious, yet no bacilli could be found in them. On the places where the "bronchi-ectatischen" cavities approached the surface of the lungs, the usual knot-shaped tumors of the "perlsucht" were found on the pleura, and showed the immediate connection with this form of cattle tuberculosis.

Of this last form eleven cases were examined in which the development of the knots of the "perlsucht" did not confine themselves to the lungs, but reached out to the diaphragm, peritoneum and omentum. Several times the mesenterial glands were tuberculously changed and impregnated with firm caseous herds. The tuberculous bacilli were wanting in no case, yet here their number was extraordinarily fluctuating. In some cases only comparatively few bacilli, and those exclusively in the giant cells of the "perlsucht" knots, were found, similarly as in scrofulous glands, and in the already mentioned caseous (cheesy) herds in the lungs of cattle. I am, therefore, not able to share the often-expressed opinion that "perlsucht" knots, in contract with the tubercles in man, are always rich in bacilli. Besides such cases as run their course slowly and always show very few bacilli, there are those in which permanently or only temporarily the number of bacilli may be very considerable.

Also, in the same lung bacilli may be found to be very numerous in some spots and very scarce in others. Sections prepared from large and hard, therefore older knots contained often only scattered bacilli in giant cells. The younger knots, on the contrary, showed themselves extraordinarily rich in bacilli and allowed the recognition of the formerly mentioned relations between bacilli and giant cells with great ease.

Besides this, bacilli are found between the small cells in such numbers that in places they give the specimen a bluish color.

The caseous mesentric glands of cattle suffering from "perlsucht", which I received for examination, were always extraordinarily rich in bacilli. The bacilli were, on the contrary, less numerous in the ragged "perlsüchtigen" luxuriant growths, permeated with many little hard knots and taken from the pericardium of a beef-creature and also in the knots, which in such a case had their seat in the kidneys. In all the number of cases of "perlsucht" examined amounted to seventeen, and the bacilli were wanting in none of them.

## 2.—TUBERCULOSIS OF THE HORSE.

Four cases, of which, to be sure, I could not obtain all the organs, were examined, nevertheless it could easily be seen that tuberculosis of the horse takes a middle place between that of cattle and the same disease in man. In places the tuberculous formations on the peritoneum and omentum bore the greatest resemblance to the "perlsucht"-knots of cattle, while in the same cases and simultaneously, the lungs were permeated with extraordinarily numerous miliary tubercles, which give them, on the surface of the section completely, the appearance of a human lung supplied with miliary tubercles. In one case the way in which the tuberculous virus had got into the course of the blood led to miliary tuberculosis. Namely, the retroperitoneal glands were, changed into a very large tumor permeated with firm yellowish caseous herds, which partly enclosed the vena cava inferior and formed uneven protuberances towards the interior of the ven. Sections through this gland mass, and especially through the knots reaching into the vena cava, exhibited extraordinary numbers of tuberculous bacilli, partly free, partly filling the numerous giant cells. Several of the knots were softened on their surface and had plainly mingled many tuberculous bacilli with the blood of the vena cava. The miliary tuberculosis had, therefore, arisen here in the same manner as it has been shown by Weigert to arise in man.

Also, in the other cases of tuberculosis in horses, tuberculous bacilli could be proved in the knots from the omentum and peritoneum, in the immensely enlarged bronchial glands, and in the tuberculous knots of the lungs, spleen and liver; and moreover, here and there they were discovered in great numbers.

## 3.—TUBERCULOSIS OF THE PIG.

This appears to occur comparatively very often. Especially there are often found in the pig, caseous changes in the lymph glands of the neck which are of a tuberculous nature. In four cases in which I received such glands for examination, tuberculous bacilli were found each time, partly free, partly in giant cells. Besides this there occurs in a pig a peculiar form of caseous pneumonia, in which large parts of the lung are lobularly infiltrated with greyish-red to greyish-yellow colored masses and are almost completely empty of air. I have examined five cases of this form. The alveoli were here and there filled with dense heaps of tuberculous bacilli. In other places the bacilli had already forced themselves into the surrounding tissue and bacilli-bearing giant cells had formed here. In two cases one or even several bacilli-bearing giant cells frequently showed themselves free in the alveolar spaces. It here concerned itself plainly in all these cases of caseous pneumonia about a tuberculosis arising from the aspiration of considerable masses of bacilli. In one case the still fresh infection of the lung appeared to have proceeded from the tonsils, which were changed into deep ulcerations provided with a caseous base and also containing tuberculous bacilli. Once I received pieces of muscle from a pig, which were impregnated with numerous little knots for the most part calcareous. These proved themselves under microscopic examination to be tuberculous; they contained giant cells, supplied with tuberculous bacilli.

#### 4.—TUBERCULOSIS OF THE GOAT AND SHEEP.

I only once had opportunity to examine a lung of a sheep supplied with tuberculous knots and the bronchial glands belonging with it partly caseous and calcerous. The lung tubercles contained giant cells, with not very numerous tuberculous bacilli. In the bronchial glands the bacilli were present more abundantly. One case from the goat was also at my disposal, which, to be sure, had special interest, in so far that a cavity almost as large as a fist had formed in the right as well as in the left lung, and furnished the proof that under some circumstances a condition completely analogous to human phthisis can be developed in animals. The cavities were partly filled with caseous pus. Their inner wall was sinuous, raw and fringy. Numerous giant cells with tuberculous bacilli were found in the enclosing tissue; single bacilli could also be shown in the purulent contents of the cavities. Besides this, the lung tissue in the surroundings of the cavities and for a pretty wide space was impregnated with miliary tuberculous knots, which were also provided with bacilli-bearing giant cells. Some largish knots in the spleen and liver, as well as the greatly enlarged and caseous bronchial glands, showed the same behavior.

#### 5.—TUBERCULOSIS OF THE FOWL.

This is usually endemic and not seldom destroys all the fowls of a yard. More or less rough, sometimes also perfectly smooth tumors are found in the intestines and liver of the diseased animals. These tumors are as large as peas or walnuts. In one of the cases examined one knot in the liver even reached the size of a little apple. These tumors are of a compact constitution, show themselves spotted whitish and yellowish on the intersection, and on the yellow spots are partly calcareous. In one case tuberculous knots of almost the size of a hemp-seed were present in the marrow of the bone of the long tubes (röhren). All these knots, which belong to four different creatures, were extraordinarily rich in tuberculous bacilli, these heaping themselves especially in the immediate surroundings of the calcarous parts. In the knots situated on the intestines the tuberculous bacilli could be followed into the villi intestinalis, and it is hence not improbable that they found their entrance to the inner organs from the intestines, especially also as once only scattered little knots were found in the lungs. On the other hand, it may be concluded from this result, that the bacilli can get into the contents of the intestines, be excreted with these and give rise to further infection, just as is the case in intestinal tuberculosis in man.

#### TUBERCULOSIS OF THE MONKEY.

In the case of the monkey tuberculosis acts differently, in several respects, from the tuberculosis in man. It does not usually remain confined long to one organ, but at an early stage spreads itself over the whole body. Then it does not appear in the form of numerous little knots, which have an equal size, as in human miliary tuberculosis, but leads to the formation of a larger or smaller number of tuberculous herds, whose size is very varying and which contain, especially in the liver, spleen and glands, instead of the firm caseous substance of the tuberculosis in man, a rather thinly fluid pus, so that they rather make

the impression of multiple abscesses than of tubercles. Beside these, to be sure, the typical forms of the grey tubercle with the yellowish centre occur in the lungs, on the pleura and the omentum. But these are also of various sizes and one gains the impression that the spread of the tuberculous virus in the monkey does not take place all at once, as in miliary tuberculosis in man, but is continuous and only in small quantities.

The number of tuberculous monkeys examined by me amounts to eight. In all these the disease had risen spontaneously, and apparantly the first infectious herd still existed in the lung. Only in one case had the tuberculosis proceeded from the *cavitas navium*. An abscess had formed in the nasal duct, which was probably caused by a wound from a scratch at the entrance of the nose, and had spread constantly but slowly farther upon the septum and the turbinated bones. The submaxillary lymph-glands swelled and became purulent. Not until then did the previously active and strong animal have trouble in breathing and become emaciated. In the dissection very numerous tubercles of varying size were found in the lung, spleen, liver and omentum.

In all the cases the tuberculous bacilli could be proved, and, moreover, in the tubercles of the most different organs. Nevertheless the number of bacilli was not very large.

#### 7.—SPONTANEOUS TUBERCULOSIS OF GUINEA PIGS AND RABBITS.

Among many hundred rabbits and guinea pigs, which were bought for experimental purposes, were experimentally used and were finally dissected, there was not a single animal which was tuberculous. Not until after the attempts at infection with tuberculous substances had begun and a large number of tuberculous animals found themselves in separate cages, but in the same room with other animals, single cases of spontaneous tuberculosis occurred among the latter. Nevertheless plainly visible symptoms of tuberculosis hardly ever showed themselves in such animals until they had spent three to four months in a room with tuberculous animals. It was a very characteristic appearance also, that when the number of artificially infected tuberculous animals decreased, the cases of spontaneous tuberculosis became correspondingly rare; the reverse being also true. For a considerable time, when only very few tuberculous animals were kept in the space used for such experiments, the spontaneous tuberculosis among the other very numerous guinea pigs and rabbits ceased entirely. The changes which were found in the animals dying from spontaneous tuberculosis distinguish themselves from those caused by artificial infection in a very characteristic manner, so that the varying methods of infection can be recognized with all certainty. There were regularly in animals dying with spontaneous tuberculosis one or more large tuberculous herds in the lungs, which were far advanced in caseous degeneration and at the same time decidedly enlarged and caseous bronchial glands. A few times larger herds were wanting in the lungs, only the bronchial glands were extraordinarily large and filled with caseous contents. The tuberculous changes had made in the other organs comparatively little progress.

The artificially infected animals conducted themselves differently according as they were infected by subcutaneous inoculation or by the inhalation of

bacilli-bearing liquids. Usually the inoculation took place in one side of the belly, and the lymph-glands situated next to the point of inoculation were found considerably swollen and caseous. The bronchial glands, on the contrary, were almost always so small that they could scarcely be found. Also in these cases the liver and spleen had undergone the greatest tuberculous changes, while the tubercles in the lungs were still comparatively small. In the case of animals infected by inhalation, which had always taken considerable numbers of bacilli into the lungs, there were found corresponding to this, not one or a few great herds, but a very large number of little tubercles in the lungs. If one considers these experiences gained from artificially infected animals, then he will be obliged to represent to himself the spontaneous tuberculosis, as it occurred under the above mentioned circumstances in guinea pigs and rabbits, as having arisen through inhalation of one or more infectious germs, that is bacilli.

Of this sort of spontaneously-diseased animals I have examined seventeen guinea pigs and eight rabbits, among them a wild rabbit, which, as the only one of ten animals of the same sort, died after three months' imprisonment, tuberculous in a high degree. These all had many, in some cases indeed extraordinarily numerous bacilli in the surroundings of the caseous herds of the lungs. In the secondarily arisen tubercles the number of bacilli was usually less. It seems to me worthy of mention, that many times, in the larger caseous herds of the lungs, the central dissolution was very far advanced, and in consequence of the same complete cavities, though of slight extent, had formed. Up to a certain degree spontaneous-inhalation-tuberculosis brings on conditions in these animals which are analogous to those of human phthisis. The infection only does not remain long enough localized, it spreads too early to other regions of the body and leads thereby to the death of the animal before important cavities can form as they occur in the human lung.

Tuberculosis of the remaining organs takes a very peculiar course in both the rabbit and the guinea pig, and moreover a different one in each. In the beginning, in both sorts of animals, the tuberculous knots in the liver and spleen have the usual characteristic appearance which they maintain in the lungs. They are miliary, gray looking little knots, with yellowish centre, and of a quite compact consistence. In guinea pigs the spleen is decidedly enlarged, and of a blackish-red color, on which background the grayish knots show very plainly. Very soon, however, the tubercles become confluent and there arise larger whitish gray islands. These too increase constantly and give the spleen a light grayish-red and blackish-red marbled appearance. Finally the light parts get the upper hand, and the spleen can then take a wholly unusual appearance, which does not in the least suggest the origin of this condition in tuberculosis, especially when it comes to little ruptures and hemorrhages in the fragile spleen-substance, by which it gets a still gayer coloring. At all events it is very peculiar that tuberculosis in the spleen of the guinea pig leads to such widespread "conglutination-necrosis," but never to genuine caseous degeneration, while in the lymph-glands of these animals a decided caseous degeneration occurs. The liver of the guinea pig acts in an exactly similar manner. In the first place gray disseminated knots form, lighter parts appear,

which increase, become confluent, and become intensely yellow in color. The liver increases enormously in size, and finally looks marbled, with spots of yellow and brown. In the darker parts of the liver there are usually still fresh grey little knots to be seen.

In the dissection of a guinea pig tuberculous in a high degree, beside the lungs permeated with little grey knots, the spleen, immensely enlarged and marbled with light grey and blackish-grey, and the liver also decidedly enlarged and marbled in brown and yellow, attract the eye, and it gives a total which can be mistaken for no other disease occurring in these animals. By the microscopic investigation of a spleen or liver so changed it is shown that in the light colored parts no nucleus coloring occurs; the cells have died and indeed a sort of "coagulation-necrosis" is present. A large part of the organ is dead, but no further dissolution occurs, the organ keeps its form and has only changed its color. In these dead masses usually only scattered bacilli are to be found. Only in single cases I have seen a peculiar increase and arrangement of the bacilli in the necrotic liver tissue, of which I will speak later. The bacilli occur more or less numerous on the border of the necrotic parts, and are then frequently enclosed by giant cells.

In the kidneys of guinea pigs I have never observed tubercles visible to the naked eye.

In rabbits the spleen and liver also appear enlarged, though in a far less degree than in guinea pigs. In this animal the tubercles always remain small and insignificant in the organs named, and there are never such changes as were described in the case of guinea pigs. On the contrary, the kidneys are almost always supplied with a number of whitish knots, which grow to the size of peas. In these knots the tuberculous bacilli are usually found in abundance, and mostly arranged in nests. Sometimes also I have found urethræ which were filled with bacilli.

#### 8.—ARTIFICIALLY GENERATED TUBERCULOSIS IN ANIMALS.

Artificially generated tuberculosis conducts itself in general just like that which arises spontaneously. It takes also the form characteristic of every special species of animals, and in fowls, for example, leads to the development of compact, knotty tumors on the intestines and the liver; in rabbits to the formation of small gray tubercles with yellowish centre in lungs and spleen, and larger whitish knots in the kidneys; and in guinea pigs causes the considerable enlargement of the spleen and liver, together with the peculiar gray or yellow marbled coloring of these organs.

Of course the various sorts of infection condition certain differences in the course of the tuberculosis in the form of the pathological changes. It is of the greatest significance whether the infection was brought about with very few bacilli or with greater numbers of them. The distinction conditioned upon this may be studied most simply in the eye of the rabbit. Namely, if as few bacilli as possible be put into the anterior eye-chamber there arise first separate little gray knots, genuine miliary tubercles, which become yellowish in the centre. Their number increases gradually, they finally become confluent and not until after a considerable time do they lead to the general caseous degeneration and destruction of the eye as well as to the appearance of tubercles in other organs. When, on the con-

trary, from the beginning an abundant number of bacilli is introduced into the eye-chamber, the first step is not the formation of single little knots, but the same appearance is manifest which has already been cursorily mentioned in the description of lung phthisis as diffuse caseous infiltration, after the aspiration of substances rich in bacilli. Also in this case the eye becomes diffusely caseously infiltrated, perishes very quickly, and the general infection, the appearance of many little gray knots in the spleen and lungs, takes place very early, usually after three weeks.

Almost the same distinction in the effect of infectious masses poor or rich in bacilli is manifest when the same are put into the abdominal cavity of guinea pigs; the one time disseminated tuberculous knots of the peritoneum and omentum with slow progress of the process, the other time considerable thickening, shrinking, and caseous degeneration of the omentum, together with a diffused infiltration of the peritoneum, with numberless tuberculous knots of the smallest kind.

The relations are still different when the bacilli are brought directly into the course of the blood, when they reach the lungs in considerable quantities by inhalation, or when the infection occurs only from a small wound on some part of the body. In each of these cases the first stages of the changes must correspond with the mode of infection used in each case.

But in its further course the disease always takes the type of tuberculosis. Especially, the secondary tuberculous knots arising at a distance from the original spot of infection always bear one and the same character. They are in the beginning little gray knots consisting of herds of epithelioid cells, contain giant cells and tuberculous bacilli exactly like the tuberculous knots arising spontaneously, from which they are in no wise distinguished.

A special description of the conduct of the tuberculous bacilli in artificially generated tuberculosis is therefore not needed, and I can limit myself to the summary enumeration of the cases examined. These concern 273 guinea pigs, 105 rabbits, 3 dogs, 13 cats, 2 German marmots, 10 domestic fowls, 12 pigeons, 28 white mice (variety of the house mouse), 44 field mice (*arvicola arvalis*), 19 rats.

In these animals tuberculous bacilli were found in the tubercles without exception. On account of the great number of animals it was, to be sure, not possible to examine all the organs provided with tubercles in every separate case, and I have been obliged in most cases to prove the presence of bacilli by crushing and spreading out some tuberculous knots from the lungs or spleen on covering glasses.

If, now, the result of the microscopic investigation of tuberculous objects, as it has been minutely described in the above, be summarized, we have the following results:

In all those disease processes which, by their course as well as by their characteristic microscopic structure and the infectious qualities of their products, must be considered as genuine tuberculosis, there occur regularly in the tuberculous herds staff-shaped forms, whose presence can be proved with the help of special methods of coloring. This is the case as well in tuberculosis of man as in that of animals of the various sorts. Also the number of single cases which generally and specially were examined for the individual forms of tuberculosis is large enough to maintain that here the question is not one of an occasional but of a constant

appearance, and that therefore tuberculous bacilli are among the component parts typical of the tubercles and their products. The two single cases in which bacilli were not to be found concern the microscopic investigation of the pus of a tuberculous abscess of the kidneys and the pus from the abscess of a vortex caries. That the bacilli were really wanting in these cases can nevertheless not be maintained, because here just such products of tuberculosis were examined as are almost regularly to be found without bacilli, owing to the fact that those originally present had vanished, as has been shown in the other examinations. Without doubt bacilli would have been found in these cases also if the original spots from which the pus came could have been examined.

On the contrary, until now, however manifold the examinations of the most various disease processes in men and animals, the bacilli peculiar to tuberculosis have never been found in other diseases. Where this has been said to be the case the statements have proved themselves erroneous, proceeding from a wrong use of the methods of examination.

A second important result is that the appearance of tuberculous bacilli marks the beginning of the tuberculous process. They appear just when the first changes in the cell elements of the tissue are noticeable. Not until the tuberculous bacilli are present do the heaps of epithelioid cells, the formation of giant cells, and the especially characteristic caseous products arising from the perishing of these cell elements, appear. Further, the presence and the number of the tuberculous bacilli are in closest connection with the progress of the tuberculous process. For where the tuberculosis bears a chronic character, only few and scattered bacilli are found; where, on the contrary, it is making rapid progress, numerous and thickly heaped bacilli are present; and where the tuberculous process has come to a standstill or has run its course, the bacilli vanish.

These three facts, namely, that the tuberculous bacilli occur regularly and exclusively in tuberculosis; that they in time and place precede all the peculiar pathological changes of tuberculosis; and that their number and their appearance and disappearance stand in direct relation to the course of tuberculosis—these facts allow us to conclude with great probability that tuberculous bacilli are not an accidental accompaniment of tuberculosis, but stand in an original connection with it.

Such far-reaching consequences hang on the decision of this question, that one cannot rest in having brought it near to a solution, but must make the attempt to decide it with undeniable certainty. Moreover, a further investigation of the conditions of life and development of these parasites promised further important light on the ætiology of tuberculosis and on the ways and means of defending humanity against this most destructive disease.

The only possibility of reaching this goal lay in taking the same way which had approved itself for the investigation of other bacteria diseases. The tuberculous bacilli must be isolated from the diseased organs, bred outside of the body in "reinculturen" (pure cultures), their behavior in this way investigated, and finally tuberculosis be artificially generated by such bacilli, freed from all admixture with the disease products.

## II.—ISOLATION AND REINCULTUREN OF TUBERCULOUS BACILLI.

It could be seen in advance that the obtaining of reinculturen of tuberculous bacilli would be attended with difficulties, and therefore from the beginning the

method of culture upon firm, transparent breeding ground was adopted, because this is superior to all other methods of reinculture in certainty and ease of management. With reference to the principle which lies at the foundation of this method, as well as in regard to its difference from other treatment, and the manifold advantages which it offers, I would refer to the minute description of the same given in the earlier pages of this paper.

At first it was attempted to grow the bacilli from crushed lung tubercles on "nahrgelatine" (meat-water-pepton-gelatine), but without success. These attempts had been made in the temperature of the room, because in greater heat the gelatine becomes liquid and thereby loses all the advantages of a firm breeding ground. Since it seemed probable that the attempts failed because a temperature of  $20^{\circ}$  C. was not sufficient for the growth of the bacilli, it was necessary to supply another firm, and at the same time transparent, breeding ground, which should contain all the component parts demanded for the nourishment of bacilli. Such an one seemed to offer itself in stiffened blood serum. I had found in experiments made for the purpose of sterilizing blood serum by repeated warming, according to the method first given by Tyndall for hay-infusion, that the serum when warmed for a considerable time over  $65^{\circ}$  C., remained stiffened and transparent. Such a breeding ground can be exposed for a considerable time to temperatures which correspond with the temperature of the body, without undergoing any changes. Bacilli-bearing substances were spread out on such stiffened transparent blood-serum, and left in a breeding apparatus at  $37^{\circ}$  C. The direct examination frequently undertaken under slight magnifying power showed after some days the appearance of peculiarly shaped colonies, which, as was recognized under a stronger magnifying power, and with the use of color reaction, consisted only of tuberculous bacilli. Nevertheless, before I proceed to the more exact description of these bacilli cultures, I have still to describe the preparation of the stiffened blood serum, which in course of time has proved itself to be the most practical.

Even the flowing of the blood into the necessary vessels demands several prudential measures. As vessels for catching the blood rather high cylindrical glasses provided with a glass stopper are suitable. These are well cleaned, then washed out with a one per cent. sublimate solution, in order to kill any bacteria germs possibly clinging to them, and then washed again with alcohol to remove the sublimate. Then one lets the blood of the slaughtered animal flow immediately from the cut into these purified vessels. Nevertheless it is well not to catch the blood first flowing after the stab, because it carries away with it cut hairs and particles of dirt from the skin and fur. The vessel should be filled nearly to the rim, closed with a stopper and placed immediately in a refrigerator. As soon as the coagulation of the blood begins the vessel must be kept perfectly still, as otherwise the formation of a firm cruor would be disturbed and a quantity of red blood-corpuscles would be mixed with the serum. The blood-filled vessels remain in the refrigerator from twenty-four to thirty hours and even longer, until a good-sized layer of completely transparent amber yellow serum has formed over the cruor. When the serum is colored more or less bloody, then it contains too many red blood-corpuscles and becomes opaque in warming. The serum is now filled by means of a pipette into re-agent glasses which are provided with a wadding stopper. The pipette as well as the re-agent glasses and the wadding stopper, are previously made

free from bacteria germs by heating them at least an hour at 150–160° C. in a double walled heating box made of sheet iron. One fills the re-agent glasses about one-third with serum, and closes them immediately with a stopper made of cotton wadding. In spite of all this care there are regularly found in the blood serum bacteria germs, which come from the air, from the hair of the slaughtered animal, etc., and would very soon cause decay and decomposition of the serum if they were not destroyed. Other liquids destined for the “reincultur” of bacteria can be sterilized, that is made free from all bacteria germs, easily and certainly by boiling. This cannot be done in the case of blood serum, because by higher temperature it completely loses its transparency. There remains, therefore, only the method adopted by Tyndall in the sterilization of hay-infusion, that is, instead of heating it once to a boiling temperature, to heat it repeatedly at a temperature of 55°–60°. The bacteria, namely, if not spore-bearing, are easily killed in liquids even by a temperature of 55°. The spores, on the contrary, as is well known, endure these temperatures and do not die until the boiling point is reached. Once heating of the liquid, therefore, only kills the spore-free bacteria and leaves the spores which may be there untouched. In the medium so favorable to their growth, however, the spores germinate soon, changing themselves into bacilli, and as such cannot stand a temperature of 55° they are therefore killed by successive warmings before they have had time to form new spores. But since the spores germinate at different times, and often do not develop into bacilli until after several days, it is necessary to repeat the warming. Experience has taught that it is almost always sufficient to warm the blood serum for an hour for five successive days to free it completely from germs which are capable of development. This warming can take place in an open water bath. It is safer to use a tin vessel especially kept for the purpose and which possesses double walls filled with water and a cover constructed in the same manner, so that the warming shall be equal on all sides.

The blood serum sterilized in this manner is then stiffened, and in order to get the greatest possible surface for inoculation the re-agent glasses should be held in a very slanting position. Also tin boxes with a double bottom and a glass cover, placed in a slanting position, are practical for this purpose. The water in the bottom of the glass is so heated that a thermometer lying in the box between the re-agent glasses shows 65° C. In this temperature the serum stiffens in from half an hour to an hour. The serum of different animals is not uniform in its conduct. The serum of sheep usually stiffens most quickly, calf serum most slowly. When serum is warmed at a higher temperature, for example at 70°, it stiffens far more quickly, but it is then more difficult to keep it transparent. A well-prepared blood serum must be almost completely clear, transparent and amber-like. At most only at the lower end of the re-agent glass and in the thickest layer may it be whiter and less transparent. It must also not be too soft, but must almost have the consistence of a hard-boiled hen's egg.

During the warming, usually on the upper cooler wall of the re-agent glass, more or less steam condenses and forms drops which, when the re-agent glass is taken up flow down and collect between the deepest part of the serum and of the glass wall. A small part of the area of inoculation is covered by this liquid. Nevertheless the liquid is in so far of value that it takes up by diffusion soluble substances from the stiffened blood serum and is changed into a very good breeding

solution. When the bacteria to be cultivated are spread out upon the stiffened serum, just up to the edge of this liquid, then they develop at the same time and close by each other on the firm breeding ground and in the breeding liquid, so that their special modes of growth in liquid and upon a firm substratum can be immediately compared.

When the re-agent glasses provided with stiffened blood serum are preserved for a length of time, since the wadding stopper does not prevent evaporation of the moisture, a very gradual drying of the serum, progressing from above downwards, takes place, yet it occurs so slowly that for months a sufficiently large area suitable for cultures remains at disposal between the upper dried part of the serum and the lower part covered by the liquid.

When the sterilization of the blood serum has not succeeded, this shows itself a few days after the stiffening, especially if the serum be put experimentally into the breeding apparatus. In these cases little whitish points form which appear singly or in larger numbers, and soon enlarge. Sometimes the blood serum becomes liquid under the influence of such bacteria, then loses its clearness and becomes covered with a whitish skin. Microscopic investigation shows that we here always have bacilli which plainly have proceeded from spores germinating late. As a matter of course, only such serum glasses may be used for "reinculturen" as after several days' stay in the breeding apparatus show no trace of such impurities, but remain completely clear and transparent. For many purposes, especially when it is wished to examine the reinculturen directly with the microscope under slight magnifying power, it is to the purpose to stiffen the serum in watch glasses or other suitable vessels. Such vessels should have a glass cover as a protection against the entrance of air germs. They are further placed in glass vessels which are lined with moist blotting paper, and can so be exposed to the breeding temperature. So sure a protection from injurious impurities as the re-agent glasses closed by wadding is, to be sure, not given by this arrangement, and reinculturen continued through many repeated breedings of tuberculous bacilli are only to be carried on by the help of blood serum stiffened in the re-agent glasses.

Just as great care as the preparation of the sterilized stiffened blood serum demands is absolutely necessary when the sowing is to be made on the prepared breeding ground, if at the same time the entrance of foreign germs and the defilement of the breeding ground by bacteria and fungi is to be prevented.

As to the material to be used for sowing, that is naturally the most suitable which contains many bacilli, is of a soft nature (that the bacilli may be spread as quickly as possible), and is as fresh as possible, that is as free from the bacteria of decay. When these latter are confined to the surface of the organ which is to serve as a point of departure for culturen, it is still possible with certain precautions to obtain reinculturen of tuberculous bacilli. But as soon as the foreign bacteria have forced themselves into the deeper layers all attempts to separate the tuberculous bacilli from them in culturen will be in vain, because the bacteria of decay grow with extraordinary rapidity in comparison with tuberculous bacilli and have taken possession of the entire breeding ground before the last have reached a visible growth.

Also, when the sowing material contains very few bacilli and is of a firm consistence, there are difficulties in causing the cultures to grow. In this case, namely,

the bacill-bearing substance cannot be so crushed that the bacilli can be spread out free and upon the surface of the blood serum ; on this account they remain hidden in the substance, develop there and the colonies growing in scanty numbers withdraw themselves easily from observation.

The reinculturen succeed most surely when a tubercle rich in bacilli, or richly tuberculous substance from the interior of a still slightly caseous lymph-gland of a guinea pig killed for the purpose, be used for sowing. For this purpose one should proceed in the following manner : A number of knives, scissors and pincettes are so thoroughly heated in the flame that they are freed from all bacteria clinging to them, and laid ready in such a manner that no impurities can afterward get at them. In the mean time, the animal, which must just have been killed, is spread out upon a dissecting board. In order, when cutting through the skin to avoid dusting off particles of dirt, hairs, etc., the fur of the animal should be thoroughly moistened with a one per cent. strong sublimate solution. After this one cuts through the skin with the still hot scissors and with the help of the still hot pincette, and lays it back on both sides so far that the lymph-glands of the regio axillaris and inguinalis are completely free, but the glands, if they are to be used for reinculturen, must not be touched with the instruments used in cutting the skin. With another hot pair of scissors another piece, 1-2 qu. ctm. large, is cut out from the side wall of the thorax, and the surface of the lungs laid bare. By this means a number of little tuberculous knots are made accessible, from which, as quickly as possible, with still other instruments, which must have been cooled for this operation, one or more are prepared. In order to free the bacilli contained in the little knots, one cuts or crushes these with the scissors or, still better, between two scalpels which have been previously heated and cooled. The substance broken and rubbed to pieces is then put into the re-agent glass, spread out upon the surface and rubbed with a platinum wire which has been melted into a glass staff, and has immediately before using been heated and cooled again. The re-agent glass is to be held slantingly or almost horizontally between the thumb and the forefinger, and the wadding cork must be so held in the mean time with the other fingers of the hand that impurities from coming in contact with other objects may not reach it. The placing of the substance on the stiffened serum which, for the sake of brevity may be called inoculation, must be done as quickly as possible in order that the germs of foreign organisms from the air may not get upon the inoculating substance, or into the re-agent glass. It is also advisable to undertake the experiment in a room in which no dust is stirred up, and moreover all unnecessary motions which could cause dust from clothes, etc., to get into the air are to be avoided, since experience has taught that the germs of micro-organisms cling to the particles of dust suspended in the air.

In spite of all these prudential measures the entrance of single foreign germs is not to be avoided with absolute certainty, and it is necessary in every single case to inoculate several re-agent glasses, perhaps 5-10, that if the reinculture does not succeed in the one or the other, the remainder may be free from all impurities.

In such manner as the preparation of lung tubercles for sowing has been described, must the experiments be conducted when lymph-glands, tubercles of the

spleen, etc., are to be used for culture. One must always operate with instruments that have been made red-hot, and these must be changed every time a new layer is to be exposed. All preparatory cuts which do not touch the inoculating substance itself are to be made with hot instruments, the inoculating mass on the contrary to be cut out with cooled scissors and pincette. The constant change of instruments is necessary in order that impurities which might attach themselves to the instruments in cutting the skin and the superficial layers may not be carried into the culture.

When the organs of animals which have just died or just been killed were at my disposal, and the sowing was carried on in the manner just described with substances containing tuberculous bacilli, the reinculture have succeeded without exception. The result was, on the contrary, uncertain when the material from human corpses or cattle suffering from "perlsucht" was used, since there were always impurities on the surface, and it was moreover not wholly fresh when I received it. In these cases I have first repeatedly and thoroughly washed the surface of the object with one per cent. sublimate solution, then with constantly changed, glowing hot instruments taken off the upper layers one at a time, and cut the inoculating substance from a depth at which I could feel sure it was free from foreign bacteria. In this manner I usually succeeded in obtaining reinculture from material of this sort, especially from little lung vomicae lying near the surface whose covering was removed with hot instruments after treatment with sublimate.

After the stiffened serum is inoculated with a bacilli-bearing substance, the vessels are placed in a breeding apparatus and kept constantly at a temperature of 37° C. Not every breeding apparatus is adapted to the culture of tuberculous bacilli. The growth proceeds but slowly and the vessels must therefore remain for weeks at a time in the apparatus. When the breeding apparatus, owing to its construction, causes a rapid evaporation of liquid from the vessels, the serum dries before the tuberculous bacilli have developed into visible colonies. Especially such apparatus as are unequally warmed, so that the steam always present in them condenses on the cooler places, for example on the glass cover, and must be constantly replaced by steam developed from the culture vessels, cannot be used. The Arsonval thermostaten are very practical; the warmth is evenly divided and the serum keeps almost unchanged in them.

In the first few days one will notice no change in the culture in the breeding apparatus. If a change occurs, if whitish or even other colored drops or spots appear on the surface of the serum, if these enlarge more or less quickly, becloud the liquid in the bottom of the glass, or even liquefy the serum, this is a sign that the culture is not successful, and that foreign bacteria have forced themselves in and grown more luxuriantly than the bacilli. If one examines such drops or spots he always finds them to consist of bacilli or micrococci which, under Ehrlich's color treatment, always take a color opposite to that of the tuberculous bacilli, and are distinguished from them in size and shape.

In those little glasses which have remained free from such impurities the first suggestions of the growing colonies of tuberculous bacilli do not show themselves until after ten to fifteen days. They appear as pale white little points or spots, which lie on the surface of the serum, are without lustre, and on that account

show plainly against their moist surroundings. They can best be compared with little dry scales which are slightly attached to the serum surface. According as the inoculating substance was rubbed upon a greater or less surface, and according to the abundance of bacilli in the same, the scales develop in smaller or greater numbers and extent on the serum surface.

The single scales only reach a limited spread, so that when only a few are present they remain separated. When numerous and thickly crowded together, on the contrary, they finally unite and form a thin, grayish white lustreless coating on the serum.

(*To be continued.*)

## ARE QUADRUPEDS SUBJECT TO HÆMORRHOIDAL DISEASES ?

BY DR. J. FAUST.

This question is in brief answered by William Bodenhamer, A.M.M.H., in the *New York Medical Journal*, January 12, 1889, and to find proof for his theory, he backs his opinion by veterinary literature, namely: Mr. Hill, a veterinary surgeon of London; Mr. Armatage, also a veterinary surgeon of London; Mr. Gamgee; also a Dr. Nathaniel Field, of Jeffersonville, Ind.; Prof. Gohier, of Lyons, France, and Prof. Chassier. Strange to say, the gentleman stopped short there, not mentioning a single German author, which in my judgment should have a place in veterinary literature and science. In Friedberger and Froehner's *Handbuch der Speciellen Patalogie und Therapie*, published in 1886, the gentleman will find proof enough that hæmorrhoids do exist in quadrupeds. He will find clearly demonstrated there the difference of hæmorrhages from hæmorrhoids or other hæmorrhages which are not hæmorrhoids, namely, Milzbrand Apoplectische form, Petechialfieber der Pferde, de Kabafieber beim Rind, etc. This corresponds correctly with his own idea that bleeding by the rectum sometimes proceeds from other sources than hæmorrhoids.

A few words of description of hæmorrhoids: Diese diffusen oder knoten artigen Varikosen Erweiterungen der Hæmorrhoidelvanen welche theils im Submucossen sogananuta innere Hæmorrhoiden, theils im subcutanen gawalœ ausserhalt des after sogananuta æussere Hæmorrhoiden sitzen, also a symptomatology and lastly the therapeutics.

The following literature will bear evidence that quadrupeds do have hæmorrhoids.

1. Gielen Magazine, 1846, page 78.  
Gielen Magazine, 1854, page 489-494.
2. Vogel Report, 1863, page 116.
3. Spinola Handbuch der Specellen Patalogie, 1862, Vol. 2, page 255.
4. Schnele und Kaisers Thierarzt, 1864, page 250.
5. Pflug Adam's Wochenschrift, 1865, page 73.
6. Utz. Bad Mittheil, 1873, page 116.
7. Siedamgrotzky Haubner Laud Wirthschrift Thierheilkunde, 1884, page 92.
8. Eggling, Hasse. Preuss Mittheil, 1880-81, page 57.

My personal experience proves to me that quadrupeds do have hæmorrhoids. On April ninth I was called to see a cow, which I found suffering from hæmorrhoids; this is the third time I have treated the same cow. I have also treated other cases of this kind.

The same journal, dated April 6, in an article headed "The Ascent of Man," the statement is made that the agonizing penalty is paid for the pleasure of walking on two feet instead of four, by prolapsus ani. A contradiction of this theory in veterinary literature can be found in J. Woodroffe Hill, page 214. Robertson's Practice of Equine Medicine, page 266. Prof. Willmar Zipperlen in his work, page 416, and Dr. Wm. Schwabe, page 371, is positive proof for prolapsus of the ani. In accordance with the proof I have given, quadrupeds do have hæmorrhoids, also prolapsus ani. These gentlemen must find proof for Darwinism outside of the quadrupeds.

## REPORTS OF CASES.

*"Careful observation makes a skillful practitioner, but his skill dies with him. By recording his observations he adds to the knowledge of his profession, and assists by his facts in building up the solid edifice of pathological science."*—VETERINARY RECORD.

### TUBERCULOSIS IN A DOG.\*

BY AUSTIN PETERS, M.R.C.V.S.

The following case of tuberculosis in a dog illustrates the

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\*Transactions of the Massachusetts Veterinary Association, Monthly Meeting, February 27th, 1889.

transmissibility of this disease from mankind to the lower animals.

The animal in question was a young white poodle dog. I was first called to see him on December 29th last, and was told that he had been sick several days, and the owner's family thought he had taken cold. When I first saw him his nose was cool and moist, the respiration rapid and jerky, somewhat abdominal. The history then was that at times his nose was hot and dry, and that his appetite was capricious, sometimes good, and at other times poor.

I thought it was a bad case of bronchitis, and prescribed a simple cough syrup, telling the people of the house to let me know if he was not better in a few days. I saw him again in much the same condition December 31st, and again January 2d.

January 2d I learned more of the history of the case, which aided me in reaching a hasty, but, as was afterwards proved, a correct diagnosis.

Mrs. H., the wife of the owner of the house where the dog was kept, died of consumption November 8th last, after a long and lingering illness of over a year. The dog, then a puppy, had been given to the children of the family the previous July, and I was told that he had acquired the disgusting habit of eating the sputa coughed up by Mrs. H. from the spittoon whenever he had an opportunity, although he was continually driven away when he was noticed to be indulging his abnormal appetite.

"Is it not possible," I was asked, "that he may have taken consumption from Mrs. H.?" I thought it not only possible, but probable, and as he was the pet of the young children advised his speedy destruction. He was therefore shot that evening (January 2d) and I held an autopsy upon him the following morning.

The post-mortem examination revealed phthisis of both lungs, with a large abscess in the posterior lobe of the left. There was also a little purulent fluid in the thoracic cavity, and a somewhat fatty liver, which I thought might contain miliary tubercles.

Scrapings were made from the walls of the abscess, and smeared on cover glasses, and then stained for the bacilli of tuberculosis, which I found in large numbers under the microscope. In places there were clumps of bacilli, ten or twelve in number.

Cover glass preparations were also made from the liver, but revealed no bacilli or signs of tubercle; they contained, however, a large number of fat cells.

Owing to lack of time, no sections have been cut for examination from either lungs or liver.

Excepting the liver, the abdominal viscera appeared healthy. I regret to say that I did not open the stomach or intestines, but they showed no outward signs of disease. This appears to be a case of inhalation tuberculosis, rather than one of ingestion, but the bacilli no doubt gained access to the respiratory apparatus as a result of the dog's filthy habits.

We often hear stories of cats and dogs being kept as pets by consumptives, pining away and dying, but we do not often have a case recorded backed up by absolute proofs, where a post-mortem is held on the animal, and the bacilli found as final evidence of the disease.

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#### ATRESIA ANI.

BY J. MINCHIN, V.S.

No doubt you will be somewhat surprised to receive this from a stranger to you, but I hope you will give it your consideration, and let me know if there is any case or cases similar in the American record. I was called to see a colt Tuesday last, foaled Sunday; was all right apparently till the afternoon, when dullness appeared. On Monday got worse, would not nurse, and towards night would *paw* and try to evacuate in the usual way but without success. To my surprise I found a total occlusion of the anus which was not discovered before. I made an incision where the cul-de-sac was visible and extracted several hard pellets of the meconium, which gave him instant relief. Not been satisfied I made a transverse incision when the struggle caused it to expel quite a quantity more; then I trimmed the wound and made what to me was a good opening; put a pledget well satu-

rated with cooling lotion after cauterizing the border, and in two hours the colt was nursing and did not appear to mind it. Of course I left the pledget in so as to dilate the orifice.

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CASE OF MOLLUSCOID FIBROMATA IN A HEIFER.\*

BY AUSTIN PETERS, M.R.C.V.S.

*Mr. President and Gentlemen:*

I thought the following case might be interesting, as it is unlike anything I have ever seen before.

January 31st I went to the farm of Mr. H., at Concord, Mass., the owner having requested me to come out there, a few days previous to the above date, to see a two-year-old Jersey heifer, which had a lot "little tumors on her belly, which look more like a lot of mushrooms growing upon her" than anything he could think of.

The heifer was indeed a sight to behold. The under surface was a mass of warty-looking tumors, hanging down several inches, extending forward to within three or four inches of the fore legs, and backward covering the udder and extending some distance up the escutcheon.

They were pedunculated, massed closely together, and varied in size from a pea to a hen's egg. Their surface was smooth and devoid of hair, and they looked very much like a cluster of small potatoes, or, as the owner suggested, "mushrooms," depending from the ventral surface of the body. I started to count them, but as I had to take a train back to Boston, found I had not time, but estimated their number at from six to eight hundred. I removed two or three of the largest by twisting them from their pedicles. When fresh cut in two with a knife, the cut surface presented a pearly glistening appearance and a quantity of serous fluid dripped from them; at the base blood vessels entering them could be clearly seen, which in dividing and spreading through the substance of the tumor gave a very pretty injection

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\*Transactions of the Massachusetts Veterinary Association, Special Meeting, March 18th, 1889.



appearance. In some of them one or two spots of extravasated blood were to be seen, due to rupture of small vessels.

Specimens of the tumors sent to the Pathological Department of the Harvard Medical School were pronounced by Dr. Sears to be molluscoid fibromata.

The growth has been very rapid, as it was not noticed until the animal was brought up from pasture last fall, and then looked like only a few small warts. A number of small warty growths had begun to appear on the under surface of the tail, on the near shoulder, and in places on both sides of the neck.

As I did not deem it worth while to try treatment, the animal was destroyed, Mr. H. kindly having some photographs taken, of which he sent me a number, one of which it gives me pleasure to present to this Association.

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## VETERINARY LEGISLATION.

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### AN ACT TO REGULATE THE PRACTICE OF VETERINARY MEDICINE AND SURGERY IN THE STATE OF CALIFORNIA.

*The People of the State of California, represented in Senate and Assembly, do enact as follows :*

SECTION 1. That the California State Veterinary Medical Association, a duly incorporated organization, be and is hereby recognized as authority in all questions relating to veterinary science in this State.

§ 2. That it shall be unlawful for any person to practice veterinary medicine and surgery in this State, without having previously obtained a diploma from a college duly authorized to graduate students in veterinary medicine and surgery, or is a member in good standing of the California State Veterinary Medical Association sixty days after the passage of this act, or who has passed a satisfactory examination before the Board of Examiners, as is hereinafter provided.

§ 3. This Board of Examiners, to be known as the State Veterinary Board, consisting of five duly qualified practitioners in veterinary medicine and surgery, is hereby created, whose duty

it shall be to carry out the purposes and enforce the provisions of this act. The members of said Board shall be appointed by the California State Veterinary Medical Association. The Board so appointed shall hold their offices for four (4) years. Said Board shall be paid five dollars per day and all necessary expenses while actually engaged in the duties of their office at the meetings of said Board, which shall be held at least once every six months after the appointment of said Board, such meeting to be held alternately in San Francisco and Los Angeles. Said compensation to be paid out of the fees and penalties received under the provisions of this act, and no part of the salary or other expenses of the Board shall ever be paid out of the State Treasury.

§ 4. Said Board of Examiners shall examine all diplomas as to their genuineness. Affidavit shall be made by the holder of a diploma that he is the person mentioned therein, said affidavit being sufficient guarantee that it is genuine. Each applicant not holding a diploma shall submit to a theoretical and practical examination before the Board; said examination to be written or oral, or both, and sufficiently strict to satisfy the Board that the applicant is competent to practice veterinary medicine and surgery. An examination fee of five dollars shall be paid to the Board by the holder of a diploma, and ten dollars by an applicant not holding a diploma, before examination. And in case of failure of approval, said fee shall be forfeited to the Board.

§ 5. All examinations of persons not graduates shall be made directly by the Board, and the certificates given by the Board shall authorize the possessor to practice veterinary medicine and surgery in the State of California. But said examination of ungraduated practitioners must take effect before the thirty-first day of December, 1889. After that date no certificate shall be granted except to persons presenting diplomas from legally chartered veterinary institutions.

§ 6. Upon the approval of the credentials or the examination of an applicant said Board shall grant him a license to practice in this State, and shall receive therefor a fee of five dollars, said license to be signed by all the members of the Board.

§ 7. Every person qualified, as required by this act, shall,

upon receipt of his license to practice, have said license filed in the office of the Clerk of the county in which he resides. Any person removing to another county to practice shall file the license in like manner in the county to which he removes. The holder shall pay to the County Clerk the usual fees for filing. Any failure, neglect, or refusal on the part of any person holding such license to file the same with the County Clerk as above directed, for a period of six months, shall forfeit his license; and no license when once forfeited shall be restored except on the payment to said Board the sum of twenty-five dollars as a penalty for such failure, neglect or refusal.

§ 8. Any person shall be regarded as practicing veterinary medicine and surgery within the meaning of this act who shall profess publicly to be a veterinary surgeon, or appends to his name any initials or title implying qualifications to practice, or who prescribes for or treats sick or injured domestic animals for compensation, either directly or indirectly. But nothing in this act shall be construed to prohibit members of the medical profession from prescribing for domestic animals in cases of emergency, and collecting a fee therefor, nor to prohibit gratuitous services in cases of emergency. And this act shall not apply to commissioned veterinary surgeons in the United States Army.

§ 9. Any person practising veterinary medicine or surgery in this State contrary to the provisions of this act, shall be guilty of a misdemeanor.

§ 10. This Act shall take effect sixty days from and after its passage.

AN ACT TO PROTECT THE TITLE OF VETERINARY SURGEON AND TO REGULATE THE PRACTICE OF VETERINARY MEDICINE AND SURGERY IN NEW JERSEY.

1. *Be it enacted by the Senate and General Assembly of the State of New Jersey*, That every person who shall assume, or use, or cause to be used, any title pertaining to the practice of veterinary medicine or surgery, or any of the branches of veterinary medicine or surgery, shall be a graduate of a legally chartered veterinary college or university, having the power or authority to confer the degree of veterinary surgeon or analogous title, except

as provided for in section two ; and such practitioner shall be required to register in the book kept for that purpose, in the office of the county clerk of the county in which he resides.

2. *And be it enacted*, That any person who has assumed the title of veterinary surgeon or analogous title, in this State, for the five years preceding the passage of this act, without being entitled to the degree of veterinary surgeon or analogous title, shall be allowed to continue the use of the title ; but such person shall appear before the county clerk of the county in which he resides and make affidavit of that fact ; he shall then be recorded as an "existing practitioner."

3. *And be it enacted*, That the county clerk shall purchase a book of suitable size, to be known as the "veterinary medical register" of the county, and shall set apart one full page for the registration of each practitioner ; and when any practitioner shall die or remove from the county, the county clerk shall make a note of the same, and shall perform such other duties as are required by this act.

4. *And be it enacted*, That every practitioner who shall be admitted to register shall pay to the county clerk the sum of one dollar, which sum shall be compensation in full for registration ; the county clerk shall give a receipt for the same, and such registration shall take place within six months from the passage of this act.

5. *And be it enacted*, That nothing in this act shall be so construed as to prevent any veterinary surgeon (if legally qualified to use the title) from using the title of "veterinary surgeon" or analogous title, in this State ; but if such veterinary surgeon opens an office or uses the title for the transaction of business, he shall be deemed "a sojourner," and shall conform to the requirements of this act.

6. *And be it enacted*, That any person who may desire to commence the practice of veterinary surgery or medicine, or any of its branches, in this State, after the passage of this act, and who holds a veterinary diploma, issued, or purporting to have been issued, by any veterinary college or university in this State, another State or foreign country, shall make affidavit before the county

clerk that his diploma has been regularly issued by a legally chartered veterinary college or university, after which such person will be allowed to register as provided for in this act.

7. *And be it enacted*, That any person who shall present to a county clerk a veterinary diploma which has been obtained fraudulently, or which is, in whole or in part, a forgery, or shall make affidavit to any false statement, intended to be filed or registered, or shall use the title of veterinary surgeon or analogous title, without conforming to the requirements of this act, or shall otherwise violate or neglect to comply with any of the provisions of this act, shall be deemed guilty of a misdemeanor, and, on conviction, shall be punished for each and every offence by a fine of one hundred dollars, one-half to be paid to the prosecutor, and the other half to be paid to the county, or shall be imprisoned in the county jail in the proper county for a term not exceeding one year, or both or either, at the discretion of the court.

8. *And be it enacted*, That no person shall recover in any court in this State any sum of money whatever for any veterinary, medical or surgical services, unless he shall have complied with the provisions of this act, and is one of the persons authorized by this act to practice as a veterinary surgeon or veterinarian.

9. *And be it enacted*, That in order to secure to the veterinary associations and societies of the State and the State Board of Health a full record of all veterinary physicians and surgeons in this State, it shall be the duty of the county clerk of each county of the State to furnish to all incorporated veterinary associations and societies of the State and to the State Board of Health a list of names of all the veterinary physicians and surgeons who have deposited with him copies of their diplomas, and the name and place of the institution purporting to confer such diploma, and each county clerk shall yearly furnish to the veterinary associations and societies of the State, and to the State Board of Health, a similar list of those veterinary physicians and surgeons hereafter depositing diplomas with him, and shall include in such list also the names of those veterinary practitioners filing affidavits with him as mentioned in the foregoing section of this act; and each county clerk shall keep in a suitable book an index of the names

of all veterinary physicians and surgeons depositing diplomas or filing affidavits in pursuance of the foregoing sections of this act.

10. *And be it enacted*, That this act shall take effect immediately

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## SOCIETY MEETINGS.

### THE NEW JERSEY STATE VETERINARY SOCIETY.

The New Jersey State Veterinary Society held a fairly well attended meeting at the Continental Hotel, Newark, N. J., at 2:30 P. M., on Thursday, May 16th, 1889.

It was decided to hold but two meetings each year, one on the first Thursday in August, and one on the first Thursday in November.

Dr. A. F. Sellers of Camden, and Dr. E. A. Vreeland, of Jersey City, both graduates of the American Veterinary College, were elected as members.

Dr. James McCaffrey, Dr. J. Hopkins, and Dr. W. Dimond, were proposed for membership, and were referred to the Board of Censors.

Dr. J. Nagler read a paper on "Specific Medication versus Polypharmacy," which was very instructive, and Dr. W. H. Lowe gave some interesting facts regarding the law which has been passed by the Legislature last March. Both received a vote of thanks.

The next meeting will be held in New Brunswick, and it being the annual meeting, new officers are to be elected. A banquet will follow the meeting.

CHARLES KUEHNE, D.V.S., *Secretary*.

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### GERMAN VETERINARY ASSOCIATION OF NEW YORK AND VICINITY.

The second annual meeting of the German Veterinary Association of New York and vicinity was held at Mernhard Hall, 213 Forsyth street, New York.

Pres. A. Kuntz called the meeting to order at 8 P. M. After reading of minutes of last meeting and approval of the same, the Association proceeded to elect officers for the ensuing year as follows: President, A. Kuntz, New York. Vice-President, L. R. Sattler, Newark, N. J. Secretary, J. Serling, 105 W. 105th street, New York. Treasurer, W. M. Halpabe, Hoboken, N. J. Board of Trustees, J. Kunzli, Ph. J. Serissi, N. Y., R. Simmer, Flushing.

A paper on the "Vaccination of Cattle against Pleuro-Pneumonia," with a statement of the literature extant on the subject, was read by Dr. J. Serling, New York, in which he severely criticised the theory of Dr. Gadsden that the disease got spread by the chronic or so-called recovered cases. The discussion was unusually lively and beneficial.

J. SERLING, *Secretary*.

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OBITUARY.

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## DECEASE OF DR. EZRA MINK—TWO DEATHS IN ONE FAMILY.

Dr. Ezra Mink, the well-known veterinary surgeon, died on March the 25th, at his home, in Rochester, N. Y., aged 65 years. He was born in Wayne County and practiced his profession in Lyons for a number of years. He went to Rochester sixteen years ago and had always been both prominent and successful in his chosen work. He was a member of the Monroe County Veterinary Medical Association. His son, William Mink, a veterinary surgeon at Sodus Point, died about three weeks before his father.

At a meeting of the Rochester Veterinary Medical Association, the following resolutions were adopted in memory of Dr. Mink:

WHEREAS, It has been the will of Divine Providence to remove from our midst, by death, one of the oldest and most noted members of our profession, Dr. Ezra Mink; a kind father, a loving husband and a cheerful companion. Realizing the loss our profession sustains in his demise, be it, therefore

*Resolved*, That we, "The Rochester Veterinary Medical Association," do hereby express the feelings which we hold for him as a genial and noble man and as a member of his profession; and furthermore,

*Resolved*, That, we tender our heartfelt sympathies to the family and friends of the deceased in this their time of great affliction; and also

*Resolved*, That a copy of these resolutions be transmitted to the family of the deceased and published in the daily papers and that the members of the Association attend the funeral in a body.

ALBERT TEGG,

A. DRINKWATER,

J. C. MCKENZIE,

*Committee.*

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CORRESPONDENCE.

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## PRACTICE FOR SALE.

WOODSTOWN, N. J., April 29, 1889.

*A. Liautard, M.D., V.S.*

DEAR DOCTOR.—Owing to an injury received last fall, I am obliged to give up practice in my present location; have been quite successful here, have been here three years, and have succeeded in building a practice that is worth \$2,500 per annum. The country surrounding is rich and especially adapted to stock raising, there being several large stock farms in the county, therefore a great deal of obstetrical work to be done, which together with the long drives of a country practice, and the exposure thereof, is becoming too much for me since being injured. The character of my injury (a double ventral hernia) you will readily see incapacitates me for such a practice. I intend moving to Philadelphia, and as I am anxious to have some competent person to take my practice, I take the liberty of writing you, to know if you know of a person who would like to purchase such a practice. There is no opposition here, and a good level headed, strong young man need have no fear of success. To the right sort of man will make price very reasonable and terms easy. Let me hear from you.

Yours very respectfully,

L. M. BIGNELL.

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VETERINARIANS WANTED.

CHARLES CITY, IOWA.

SIR.—I am desirous of having a veterinarian locate at this place. This city has three thousand inhabitants, and the country is thickly settled, well-stocked and not a veterinary surgeon within fifty miles of this place. Please hand this to party wishing location. Shall be pleased to correspond with such parties.

FRANK A. BURTON.

DEAR SIR.—I would like to enter into a correspondence with some one that desires a location to practice. If you have any member of your fraternity that you think wishes a place, I would be much pleased to correspond with him.

ROMEO, MICH.

ALBERT KENNEDY.

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## NEWS AND SUNDRIES.

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INOCULATION AS A PREVENTIVE OF SWINE PLAGUE.—Mr. C. H. Walker, Surprise, Neb., ex-President of the Nebraska Improved Stock Breeders' Association, contributes a letter to a western paper from which the following statements are taken: "I have continued the practice [of inoculating as a preventive of hog cholera] with the same success so frequently reported to the public in former communications to various newspapers, and I shall continue it until I have reason to stop. In general, I have the same report to make as before. That is to say that inoculation is still practiced with success on my place. All the hogs that I have inoculated I have tested as soon as convenient after they have recovered and it has proved effective. I have had an experience that it might be well to relate, inasmuch as it demonstrates the importance of exactness in this business. Dr. Billings has always placed great stress on using the culture at the proper time, always urging that success would otherwise be defeated. Having been so fortunate with my inoculations, it is proper to state that I was ready to take a few chances on a little experiment of my own, and I resolved to see what the effect of this truck that the Doctor had pronounced worthless would be on the pigs, and to that end I inoculated a litter. I have got the experience, and I am happy that the cholera has got so few of the pigs. The pigs inoculated with this culture are the only ones, with a single exception, that I have lost after their recovery from inoculation. I have another straw bearing on this subject. A neighbor who lost nearly all of his hogs in the fall purchased some sows that had passed through the cholera. He also bought a boar that had not. The boar, after being placed in his infected pens, took the cholera. As a neighborly act I loaned him one of mine that had been inoculated. This was about a month since. At this writing no complaint has been received.

# AMERICAN VETERINARY REVIEW,

JULY, 1889.

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## EDITORIAL.

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PNEUMO-ENTERITIS one of the special forms of swine scourges—it prevails in Europe—existed in England—has been observed in France—Klein, Cornil and Chantemesse, the European investigators—the search for a vaccine—the failures—F. S. Billings, (of Nebraska) claims—how successful has he been?—An experiment *a la Pouilly-le-Fort* wanted—the last word on the nature of the disease not yet told—Prof. Galtier's remarks—his investigations of an outbreak in Southern France—his report—his conclusions—sheep subject to a disease similar to pneumo-enteritis in swine—the same disease is inoculable to all farm animals—a third series of experiments shows that it can produce various affections—in cows—in calves—in horses—serious statements advanced by the learned professor—they need confirmation, if they can be confirmed—has the correct and complete biology of the microbe been studied?—has the Professor been too hasty?

THE PNEUMO-ENTERITIS OF SWINE, one of the special forms of swine scourges which prevail so extensively in this country, principally in our western regions, and which is constantly causing an amount of pecuniary loss to the country which no statistics can define, and which has been the subject of no end of scientific, and even personal discussion, is not confined in its ravages within the boundaries of the American Continent, but prevails also more or less widely throughout Europe. It was, in fact, due to the labors of the English pathologist, Klein, that the scientific world first became acquainted with the nature of its specific lesions, and Continental investigators also have recently had their attention called in the same direction. Cornil and Chantemesse, in France, have prosecuted their investigations and continued their studies during the late outbreak in Southern France, and a portion of the results of their labors is recorded in an interesting report of their observations contained in the

*Comptes Rendus*, a striking agreement being observable between the views thus propounded, and the statements and discoveries with which we have become familiar in the results of experiments and researches on this side of the Atlantic.

The great objective point of the investigations of our scientists in the present instance, is of course, the discovery of some sure method of prophylaxy against this widespread and persistent evil. But all the labors of all the pathologists, biologists, and others who have joined in the pursuit of a neutralizing or counteracting virus, or what not, have hitherto, so far as we know, proved to be abortive. The most assiduous and intelligent laborers in this important field have failed to reach a conclusion which may be considered as of positive value. In the view of those who are most familiar with this peculiar line of work, this has been about the *status quo* at the present time, of this interesting question.

But Dr. F. S. Billings, late of the University of Nebraska, now claims to have made the great discovery of a prophylactic, and if we are to believe the reports and the letters which are found in some of the Western papers, such good and *positive* results have been obtained as quite to justify the application of the new inoculation on a large scale. If this is confirmed, we most heartily congratulate the Doctor on his achievement, but it seems to us that an experiment *a la Pouilly-le Fort*, imposes itself for his reputation as well as for the success of his claims.

But the last word does not seem to be yet spoken in respect to the nature of this disease, its peculiar mode of distribution and the peculiarities of its biological features. Even the correctness of its terminology is questioned, and if we are to accept the results of the recent experiments made by Professor Galtier of Lyons, and to trust to the reports that appear in the French veterinary periodicals, the bacillus which produces pneumo-enteritis in swine is not specific to this animal. Having been appointed to study an outbreak of disease amongst sheep in a southern part of France, Professor Galtier reported to the Secretary of Agriculture that "the lesions observed were those of pneumo-enteritis; exudative

peritonitis, inflammation and ulceration of the intestines, congestion and œdema of the lungs, lobular isolated pneumonia, hypertrophy and softening of the bronchial ganglions." Also, "that in the infected farms, the diseased sheep had cohabited with swine affected with pneumo-enteritis; that in others they had been in contact with diseased hogs, or exposed to their dejections," and "that in all the lesions, a short bacteria had been found, whose morphology and cultures were very analogous, if not identical with the bacteria of hog cholera."

All this seems very well, but American and European observers seem to deny the transmission of hog cholera to sheep either by the inoculation of the cultures or that of the virus proper.

But there was more coming. Professor Galtier had promised to continue his researches, and he kept his word, and in reporting to the *Academie des Sciences* he declares that he has successfully inoculated rabbits, pigs, guinea pigs, sheep, goats, dogs and fowls with the virus which he had obtained from the sheep he had seen in the southern part of France, and that comparative inoculation made on the same various species of animals with the virus of pigs sick with pneumo-enteritis had given him the same results.' His conclusions fix the perfect identity of the disease of the sheep with the hog cholera of swine.

Again, in a third series of experiments, Professor Galtier says that the disease of the sheep which he had studied is transmissible to all farm animals, and that it may produce *epizootic abortion* in cows and *broncho pneumonia* in young calves, and that in some cases it has been described as a *typhoid affection* of horses.

These statements are of an important character, and indicate a state of things differing so totally from what has been hitherto known and admitted as tested fact, that we feel justified in expressing a fear that Professor Galtier has been hasty in his conclusions and probably has not paid sufficient attention to one especial point in the study, nor considered it as thoroughly as ought always to be done in similar zymotic affections: viz., the *correct and complete biology of the microbe he has found*,

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ORIGINAL ARTICLES.

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## ÆTIOLOGY OF TUBERCULOSIS.

By DR. R. KOCH, Privy Councillor.

(Translated by Rev. F. SAURE.)

*(Transactions of the Massachusetts Veterinary Medical Association.)*(Continued from page 130.)

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A very different image is presented by the culture developing from substances which contain only scattered bacilli. As has already been suggested, one does not succeed in such cases in freeing the bacilli by rubbing and crushing the substance, and spreading it on the surface of the serum. They remain, in the substance and form there colonies which grow almost to the size of a poppy seed. In such cases there can be no doubt that each single little colony proceeded from one single, or at most two bacilli, because microscopic investigation has always found only 1-2 bacilli in a giant cell of the tissue in question. Accordingly we can also further conclude that, in the formerly mentioned examples, the single scales developing upon the serum proceeded also from single bacilli.

If a beginning of reinculture of tuberculous bacilli has been obtained in the manner just described, they can be carried on without difficulty. For this purpose some of the whitish scales can be put into a re-agent glass containing stiffened serum by means of the platinum wire, which must be made glowing hot and then cooled again, immediately before its use. By the use of this wire the scales are also to be spread as much as possible on the serum surface, and rubbed to pieces. In this second sowing far more numerous bacilli reach the serum surface, and can there be spread more easily and evenly than was the case with the original inoculating material; in consequence of which one obtains in this and later breedings, no longer single scales, but coherent, membrane-like colonies. These take in general the figure which the motions of the platinum wire prescribed beforehand in the sowing. They can therefore be laid on in lines, either in a perpendicular or horizontal direction, or may take any figure one may choose to construct on the serum. Vigorously growing cultures nevertheless spread more or less beyond the original limits of the sowing. This spread is, however, not the consequence of independent motions of the bacilli, which, as already shown, they do not possess, but it takes place in consequence of the fact that in the constant increase of the bacilli the increase of mass does not take place in the diameter of the thickness, but in area. The growing bacilli do not heap themselves upon each other, but have the tendency to spread out in area and push the already formed coherent membrane away over the surface of the serum. This is most marked when the bacilli membrane reaches the liquid at the base of the re-agent glass. It does not penetrate into the liquid, but it forces itself over the same and forms a fine cover on the surface of the liquid. Very often indeed it presses up to a height of some millimeters on the opposite side of the glass.

The bacilli "culture" have other noteworthy qualities by which they may be distinguished from other bacteria "culture" by the naked eye. In the first

place, they never liquify the serum, as some sorts of bacteria regularly do. They do not penetrate into the serum, but always remain on its surface and lie loosely there. In consequence of this the membrane-like bacilli vegetation can be lifted and washed away by tipping the re-agent glass so that the liquid at its base may flow over the surface of the serum. Other bacteria possess a pap-like consistence and let themselves mingle with the liquid, making them cloudy. This is not the case with tuberculous bacilli. The thin membranes formed by them do not dissolve in the liquid, but in consequence of their firm consistence break into larger or smaller lumps, which are washed away by the liquid, and finally collect at the bottom of the same. The peculiar stiff and brittle constitution of the colonies shows itself best in the part of the "cultur" which covers over the liquid in the re-agent glass. As soon as this liquid is set in motion the little skin on its surface breaks into plates and lumps, which slowly sink to the bottom. The liquid always remains clear, as well when the bacilli vegetation itself stretches over it, as when by washing off of the serum surface masses of bacilli get into it, or when in the beginning the inoculating substance is intentionally put into it. From this appearance also we should conclude, as direct observation had already shown, that the tuberculous bacilli possess no independent motion; for bacilli which can move disperse themselves in all directions through the breeding solutions, and give them a cloudy appearance.

Within certain limits, moreover, the conduct of the bacilli "culturen," as seen by the naked eye, depends upon the consistence of the blood serum upon which they grow. The firmer that is, the more the bacilli colonies have the constitution just described. On a very soft gelatinous serum the development is somewhat different. The distribution of the bacilli is not uniform because the hard and firmly coherent masses of bacilli cannot be crushed on the soft serum in the sowing. The inoculating substance therefore remains lying on the serum in small detached crumbs. The growth of the colonies does not reach so uniformly over the surface as on the firm serum, but leads to thicker compact masses which cling firmly to the soft serum. Even when the serum is somewhat less soft, so that the colonies begin to spread themselves out on the surface, one notices a firmer attachment of the bacilli membrane to the serum area. One does not then succeed in washing the membrane from the serum, or lifting it off with the platinum wire, without at the same time loosening parts of the serum.

When even the properties of the "culturen" noticeable with the naked eye show a difference from other bacteria and admit a judgment as to their purity, this is much more the case when they are examined under a moderately strong magnifying power, such as is obtained with Zeiss' Objective System, A.Ä., ocular 4, with drawn out tube, (80 fold magnifying power). It is then seen that the bacilli colonies form such peculiarly shaped figures as do no other sort of bacteria. Microscopically of course these colonies can be noticed far earlier than with the naked eye. Already five to six days after the sowing takes place and the "cultur" has been kept at breeding warmth, peculiar, very dainty little figures appear on the surface of the serum. These appear as fine lines, often bow-shaped. The smallest have mostly the figure of an S. Longer colonies show the most manifold serpentine turns and windings which often remind one of interlacing letters. While the ends of these lines run off into sharp points, in the middle they are

more or less swollen to a spindle shape, and the smaller younger colonies are extraordinarily thin and delicate, the older thicker and of heavier forms. Gradually, by continued spreading and melting together, the windings take more and more a plate-like form which, by the ware-like designs and the transition of their borders into the peculiar oscillating lines of the single colonies, allow their origin as such to be recognized. Finally a number of such plates melt into each other, and form the previously described membrane-like bacilli colonies, while the plates proceeding from single colonies correspond with the whitish scales visible to the naked eye. In order to examine the colonies directly under the microscope and to follow their development, four-cornered little glass basins provided with a glass cover are specially adapted.

That these colonies are only formed by the tuberculous bacilli is soon seen when they are colored by Ehrlich's method, and examined by strong magnifying power. This can be done most practically when one presses a covering glass firmly to the surface of the serum covered with colonies and takes it up again. Numerous colonies then remain clinging to the covering glass in their natural arrangement and grouping, dry there and can be colored as was described formerly in the directions for covering glass specimens. The bacilli are not thrown together without method, but are placed with their axes of length parallel with the axis of length of colony. It is striking that the bacilli do not touch each other, but are separated, though only by slight spaces. As was formerly suggested, one may conclude from this conduct that the bacilli are surrounded by a building substance and are joined together by this, as is proved by the firm coherence of the colonies. Very frequently in farther advanced colonies one finds all or nearly all the bacilli spore-bearing.

Usually the "culturen" have reached the maximum of their development after four weeks and then remain unchanged. The continuation of the same is most practically carried on in intervals of from two to four weeks. Nevertheless such "culturen" as have existed for months are still capable of development and can be used for further breeding. By the method described in the above I have gained a number of reinculturen of tuberculous bacilli from different materials, and have continued them through a longer or shorter succession of breedings. Several attempts at "culturen," and indeed the first which were made, proceeded from guinea-pigs, which were tuberculously infected by inoculation from man and from various animals. Other "culturen" have been obtained directly from the original tuberculous material. The reinculturen indirectly gained by the help of the original inoculation of guinea-pigs relate to the following cases:

- 1.—Human lung-phthisis cultivated through twenty-two months, therefore almost two years, in thirty-four successive breedings;
- 2.—Human lung-phthisis (caseous mass from the lung) cultivated for two and one-half months in five successive breedings;
- 3.—Human lung-phthisis (contents of the lung cavity) cultivated for three months in six successive breedings;
- 4.—Human miliary tuberculosis (tubercle of the lung) cultivated for seven months in twelve successive breedings;
- 5.—Human miliary tuberculosis (tubercle of the pia mater) cultivated for three months in five successive breedings;

6.—Human miliary tuberculosis (tubercle of the spleen) cultivated for two and one-half months in four successive breedings ;

7.—Human tuberculosis of the uterus cultivated for four months in six successive breedings ;

8.—Human intestinal tuberculosis (caseous mesentric glands) cultivated for six months in nine successive breedings ;

9.—Human lung-phthisis (sputum) cultivated for four and one-half months in seven successive breedings ;

10.—Scrofula in man (excised neck-gland) cultivated for seven months in twelve successive breedings ;

11.—Tuberculosis in monkey (lung-tubercle) cultivated for six and one-half months in twelve successive breedings ;

12.—Tuberculosis in monkey (tubercle of the spleen) cultivated for seven months in thirteen successive breedings ;

13.—Tuberculosis in monkey (caseous bronchial glands) cultivated for four months in six successive breedings ;

14.—Tuberculosis of cattle (pleura knots) cultivated for three months in five successive breedings ;

15.—Tuberculosis of cattle (pleura knots) cultivated for three and one-half months in five successive breedings ;

16.—Tuberculosis of cattle (peritoneal knots) cultivated for twenty-one months in twenty-nine successive breedings ;

17.—Tuberculosis of cattle (peritoneal knots) cultivated for three months in five successive breedings ;

18.—Tuberculosis of cattle (knots from the diaphragm) cultivated for four months in six successive breedings ;

19.—Tuberculosis of cattle (pap-like caseous masses from the lung, first case) cultivated for eight months in thirteen successive breedings ;

20.—Tuberculosis of cattle (pap-like caseous masses from the lung, second case) cultivated for three months in five successive breedings ;

21.—Tuberculous bacilli "cultur" (Nos. 1 and 5 breeding) cultivated for four months in seven successive breedings ;

The following reinculturen were obtained directly from the tuberculous material :

22.—Miliary tuberculosis from man (tubercle of the lung) cultivated for nineteen months in twenty-four successive breedings ;

23.—Miliary tuberculosis from man (tubercle of the lung) cultivated for six months in ten successive breedings ;

24.—Lung-phthisis from man (contents of a cavity) cultivated for seven months in eleven successive breedings ;

25.—Lung-phthisis from man (contents of a little cavity in the tip of lungs) cultivated for eight months in ten successive breedings ;

26.—Lung-phthisis of man (contents of a closed cavity) cultivated for eighteen months in twenty-four successive breedings ;

27.—Caseous pneumonia of man (lung-tissue) cultivated for five months in seven successive breedings.

28.—Caseous pneumonia of man (lung tissue) cultivated for seven months in nine successive breedings ;

29.—Scrofulous gland cultivated for six months in seven successive breedings ;

30.—Scrofulous gland cultivated for five months in seven successive breedings ;

31.—Scrofulous gland cultivated for three months in three successive breedings ;

32.—Scrofulous gland cultivated for three months in four successive breedings ;

33.—Tuberculous testicles cultivated for four months in six successive breedings ;

34.—Fungous joint cultivated for fifteen months in nineteen successive breedings ;

35.—Lupus cultivated for sixteen months in twenty-one successive breedings ;

36.—Lung from cattle-tuberculosis (caseous mass) cultivated for six months in eight successive breedings ;

37.—Lung from domestic animal tuberculosis (calcined knots) cultivated for five months in seven successive breedings ;

38.—Knots from the diaphragm of a tuberculously diseased domestic animal cultivated for nine months in fifteen successive breedings ;

39.—Knots from the pericardium of a tuberculously diseased domestic animal cultivated for eighteen months in twenty-three successive breedings ;

40.—Caseous pneumonia of the pig cultivated for five months in eight successive breedings ;

41.—Spontaneous tuberculosis of guinea pig (knots from the lungs) cultivated for six months in nine successive breedings ;

42.—Spontaneous tuberculosis of the guinea pig (spleen) cultivated for three months in five successive breedings ;

43.—Spontaneous tuberculosis of the guinea pig (knots from the lung) cultivated for four months in seven successive breedings.

The preservation of the culture demands such an expenditure of time and trouble, that always only a certain number can be maintained at the same time. I let the most of them perish again as soon as their vegetative disease-producing qualities had been sufficiently established by a "culture" continued for several months, and by the inoculations undertaken with it. Only the Culture No. 1 (lung-phthisis), No. 16 (tuberculosis of a domestic animal), No. 22 (miliary tuberculosis), No. 26 (contents of a cavity from a phthisical lung), No. 34 (fungous joint), No. 35 (lupus), No. 39 (tuberculosis of a domestic animal) have been continued until now, and are to be further preserved in order to find out whether in the life of the tuberculous bacilli continued outside of the animal body some sort of changes may not occur in their qualities. It might appear strange that comparatively so large a number of "culture" were established, when a few would have sufficed for observing the conduct of the bacilli in the "culture." Nevertheless in the beginning it appeared to me by no means impossible, that although the bacilli of the various tuberculous forms,—lupus, phthisis etc.—showed microscopically no difference, the bacilli derived from the various sources might perhaps manifest differences in the culture. But in spite of the closest attention directed to this point, I have been able to find nothing of the kind. In the "culture" also,

whether taken from miliary tubercles or from the contents of vomicae, often lupus, often tuberculosis of domestic animals, the tuberculous bacilli have been completely uniform in their conduct. In no way has a change made itself noticed in the "culturen" continued for a longer period, between sixteen and twenty-two months. If I formally made the claim that the culturen of tuberculous bacilli possess especially characteristic properties, by means of which the tuberculous bacilli could be distinguished from other bacteria, almost with greater certainty and certainly with more important grounds than by means of their tinctorial qualities, I can in confirmation of this claim appeal to a very rich amount of examined material. There were, namely, after the favorable properties of the stiffened blood serum were recognized, numberless attempts made, partly from reinculturen of various bacteria, partly from the sowing of the most various animal substances on blood serum, but vegetations which resembled the culturen of tuberculous bacilli never appeared. These attempts belonging, to be sure, to other experimental investigations, form counter-attempts, from which we see that the above described characteristic cultures are only to be obtained from substances which contain tuberculous bacilli.

It must still be of special significance for ætiology to determine whether the tuberculous bacilli can grow and multiply under conditions which make possible to them an existence independent from the body of man and of the animals. For the decision of this question it was first necessary to examine whether the bacilli only grow on the stiffened blood serum or whether they also flourish in other nourishing media. Attempts with liquid sterilized blood serum gave the result, that little particles of bacilli-culturen, which were put on the surface of the serum in a re-agent glass, developed themselves in the way already described, just as on the surface of the liquid beside the stiffened blood serum, and formed a thin whitish coating, which was of a fragile, brittle consistence, and which broke in moving the serum and sank to the bottom. The serum always remained clear. When I did not succeed in keeping the sowed substance floating on the surface of the serum, when it sank into the liquid, the result was no noticeable increase of the sowed pieces.

The blood serum of various sorts of animals showed, as well in a stiffened as in a liquid condition, no essential difference in the power of serving as breeding ground for the tuberculous bacilli. They appear, to be sure, to flourish best on the serum of sheep, cattle and calves. But the serum of horse and swine blood gives very vigorous culturen. Even on the serum of dogs blood the culturen do not grow noticeably less vigorously, in spite of the fact that this species of animals is quite resistent to tuberculosis. On the contrary, tuberculous bacilli do not grow on the white of eggs. At first I did not succeed in bringing about the growth of tuberculous bacilli in other liquids than blood serum. When one or more crumbs of a culture were put into a glass with neutralized meat-broth, the crumbs certainly appeared in the course of four or five weeks to have increased somewhat in size, but it was difficult to decide whether a real growth had taken place. Not until I had broken the pieces of the bacilli-culture and rubbed them fine, put them into the meat-infusion and by frequent shaking dispersed them through it, that an undeniable development took place. It does not appear to be unimportant for the success of this attempt, that the culture should be placed in glass alembics with a broad,

level base—so-called Erlenmeyer alembics—and only so much liquid put into the alembic as that the bottom be covered from one half to at most the depth of a centimeter. The meat-infusion always remained clear, but in the course of four or five weeks a fine-grained sand-like looking white layer formed at the bottom of the vessel. The single little grains, which had probably grown from the scarcely visible particles of the sowed substance, consisted exclusively of tuberculous bacilli.

If one compares this conduct of the cultures in liquid nourishing media, namely their slow growth and the constant clearness of the liquid, with the reports of former culture attempts from Klebs, Schüller, Toussaint (who noticed after from one to three days a cloudiness of the culture-liquid) one cannot resist the conviction that these cultures could not have been reincultured.

Also in regard to the meat-infusion the phenomenon is repeated, that the flesh of various animals and even of such as are only slightly susceptible to tuberculosis—as dog, cat and domestic mouse—allow the cultures to develop in almost equal strength. It is to be mentioned that neutralized meat-infusion stiffened by an addition of Chinese gelatine, and thereby changed into a firm breeding ground, which can be exposed to the breeding temperature without becoming liquid, also gives a breeding ground for tuberculous bacilli cultures. This is, to be sure, considerably inferior to the stiffened blood serum, because on the slippery surface the bacilli can not be spread out well, and in consequence of this the characteristic membranous cultures are not developed, but instead compact, irregular masses. Since some disease-producing bacteria—for example inflammation-of-the-spleen bacilli, typhus bacilli, glanders bacilli and erysipelas micrococci—grow very vigorously on vegetable substances—for example especially on boiled potatoes—attempts were made in this direction with tuberculous bacilli also, but they have led to no positive results. All in all, therefore, no great scope is offered the tuberculous bacilli in regard to breeding ground.

There are similar limitations with regard to a second condition essential for the existence of bacteria, with the limits of temperature within which growth takes place.

In often repeated attempts it resulted that in a temperature of 42° C. in the course of three weeks no growth took place. Further, in 30° C. the development is very slight and ceases completely between 28° and 29° C. The cultures thrive best in a temperature of 37° to 38° C. A considerably wider range of temperature, within which they can increase, stands at the disposal of other disease-producing bacteria. The inflammation-of-the-spleen bacilli, for example, grow very luxuriantly between 20° and 24° C., and form spores in a short time. They can thrive also up to 43° C. If we take into consideration that the anthrax-bacilli can run the entire course of their development to spore formation in twenty-four to forty-eight hours, in a temperature which in summer is often reached by the surface of the ground, and that they can do this on dead vegetable substrata, the supposition is justified that they can run their course of development in suitable places out of doors and independently of the animal body. No further explanation is necessary to show that, owing to this, the ætiology of anthrax takes an altogether different shape than if the anthrax-bacilli in their existence were dependent alone upon the animal body. The same would hold good of the tuberculous bacilli, if they could grow on breeding substrata such as occur in nature and if they could

develop and form spores in a comparatively short time in a temperature corresponding to summer warmth. But this is not the case. The lowest limit of temperature in which the tuberculous bacilli are able to grow is not reached by the summer temperature ; also, the growth of these bacteria goes on so slowly that they would be crowded out by the much more quickly developing sorts of bacteria everywhere appearing before they had finished their course of development. Even if, therefore, other more easily obtainable substrata than those of an animal nature were found, which could serve the tuberculous bacilli as breeding ground, nevertheless the last mentioned reasons would speak decisively against the supposition that the tuberculous bacilli could lead an existence independent of the animal organism. We are, therefore, compelled, so far as our experience reaches, to consider the tuberculous bacilli not as bacilli which can grow anywhere, but as genuine parasites, that is such as can find the conditions of their existence only in the animal or human organism.

#### D.—ATTEMPTS AT INFECTION.

These attempts until recently have formed the most important part of the experimental investigations concerning tuberculosis. But although these have been carried on in a very extensive manner, they lack, except in a few instances, the prudential measures which must necessarily be united with them to make them free from objection.

There are three sources of error which can raise a doubt in regard to the attempt at infection. First, mistaking spontaneous tuberculosis for the tuberculosis artificially created by infection. Second, the mistaking of products of genuine tuberculous disease for pathological changes, which with the naked eye or even microscopically, more or less resemble them. Third, unintentional infection with tuberculous virus by means of infected instruments, inoculating material, etc., in short through the neglect of antiseptic prudential measures. How shall one protect himself against these sources of error ? To avoid the errors arising from spontaneous tuberculosis, it has been suggested that one experiment only with those animals in which tuberculosis seldom or never occurs. But since animals in which no spontaneous tuberculosis occurs are always more or less indisposed to this disease, and therefore furnish no reliable reagent for the effect of the tuberculous virus, this proposition is practically not feasible. Also for attempts in anthrax infection one would, for example, not choose for exclusive use dogs, which, as is well known, are almost exempt from this disease ; but, on the contrary, experiment with animals which are as sensitive as possible to anthrax-infection. The same holds of attempts at infection with tuberculosis. The more sensitive, therefore, a kind of animal is to infection with tuberculous virus, so much the better it is adapted to the infectious attempts in question. Nevertheless only under the condition that one succeeds in keeping the artificial and the spontaneous infection separate in the animals used for experiment. With some little attention this is not so difficult. The characteristic marks by which the two are to be distinguished have already been given in detail. It is self-evident, however, that, even though by means of these characteristics spontaneous tuberculosis be excluded as a cause of mistake, all prudential measures should be taken to confine the spontaneous disease to as narrow a field as possible. This may be attained by separation of the tuberculous animals in different cages, by frequent airing, cleaning and disinfecting of the stalls. Never-

theless it is not advisable permanently to keep rabbits and guinea pigs in the same rooms that contain tuberculous animals; they would scarcely remain free from tuberculosis longer than eight to ten months in infected stalls. In one case a number of animals were kept as long as possible by way of experimenting on their immunity, but in spite of the best care only here and there one remained free from tuberculosis for more than a year, and even these a few months later also became victims to the disease. After all these experiences, all the numerous experiments in which tuberculosis was conclusively shown, have little or no force as proof unless the product itself should make manifest that a spontaneous tuberculosis exists or can be excluded.

As to the second source of mistake, the confusing of non-tuberculous knots with genuine tubercles, nothing is simpler than to exclude the same. The genuine tubercles are infectious and contain tuberculous bacilli; the false do not. Even if one will not admit the diagnostic worth of tuberculous bacilli, one must distinguish between infectious and non-infectious knots. Therefore, if by an attempt at infection, for example if by the inhalation of any substance, some little grey knots be caused in the lung of a dog, one may not content himself with this simple result, and resting upon this claim that these are genuine tubercles. Under all circumstances the infectious nature of such little knots must be proved. Where genuine tuberculosis is concerned one is generally spared the trouble of especially proving their infectious nature by inoculation with the knots, for in this case the disease seldom shows itself confined to one spot; almost always it has already attacked other organs of the body, itself furnishing proof of its infectious nature by its propagating ability. Therefore, when the formation of tubercles stretches itself out past the original infectious spot into the lymph glands, lungs, liver and spleen, it can without further proof be considered infectious. If, as is, for example, the case after the inhalation of non-virulent firm particles into the lungs, and after the injection of granular masses into the "bauchhöhle" (belly cavity) in the peritoneum, the knots caused by this remained confined to the place of infection (here the lungs and peritoneum) and show no inclination to further infection of the body, then this circumstance speaks against the inference that genuine tubercles exist here, and special proof of their infectious nature must be furnished. If this is not done, as it, in an incomprehensible manner, has not been in several of the newer investigations undertaken to prove the non-infectious nature of tuberculosis, then the real proof is lacking in the experiment.

The third mistake mentioned, the unintentional infection by means of instruments, etc., appears to have clung to almost all former investigations with regard to tuberculosis to a greater or less degree, whether such investigations were directed towards proving or disproving its infectious nature. And yet this mistake may be avoided without great difficulty if one holds to the rules concerning anti-septic operations, and above all things carefully disinfects the instrument for every single attempt. All metal instruments, such as scissors, pincers, knives, inoculating lancets, must be heated thoroughly. Special care is demanded in the treatment of the syringes used for injection. Syringes, of ordinary construction cannot be disinfected with sufficient certainty, because they do not admit a high degree of heat without being injured, and liquid means of disinfection, as shown by experience, do not certainly destroy the infectious

material in the interior of the syringe and especially that clinging to the puncturing apparatus. Hence the syringes must have a special construction which makes their disinfection by heat possible. For this purpose the syringe must be made of glass and metal. The lower end of the same must be made to have an air-tight connection with the framework of the needle by means of a cork plate, set in and bored through; and the piston must be wound with a soft cotton thread. In this form the syringe can, before every experiment, be made free from infectious germs by an hour's heating at  $150^{\circ}$  to  $160^{\circ}$  C. The piston is then moistened by absorbing boiled distilled water, and if the enwrapping is done with some care, it becomes as tight as by the use of the ordinary leather or gutta percha piston.\* The hands of the experimenter are to be disinfected with a one per cent. sublimate solution, and of course everything else is to be avoided which could lead to an unintentional infection of the animal to be experimented on during or after the operation.

By all the attempts at infection to be mentioned in what follows, the prudential measures just explained were strictly carried out and, therefore, to speak again of the latter, for every attempt several freshly bought animals were used and kept in separate cages, the effect of the infection was proved so early, that a confusion with the later appearing spontaneous tuberculosis could not occur; further, the tuberculous changes appearing in consequence of the infection were always studied with reference to the presence of tuberculous bacilli, and where it seemed necessary, also especially with reference to their infectious qualities. The infection itself took place with antiseptic precaution and especially with reliably disinfected instruments.

The attempts at infection carried out in the course of my investigations regarding tuberculosis fall into two groups. To the one group belong those attempts in which tuberculous bacilli-bearing parts of tissue were used; to the second, those in which reinculturen of tuberculous bacilli were the infectious material.

#### E.—ATTEMPTS AT INFECTION WITH TUBERCULOUS BACILLI-BEARING TISSUES.

These served partly for studying the effects of the products of various sorts of tuberculous processes, partly to gain suitable sowing-material for the beginning of reinculturen. As inoculating material there were used pieces of tissue from various organs of human miliary tuberculosis, from phthisic lungs, various forms of localized tuberculosis, from fungous joints, scrofulous glands, lupus, tuberculosis of various animals. The inoculating material was always examined with reference to its contents of tuberculous bacilli. The inoculation took place in this manner: In guinea pigs a small cut was made with the shears into the belly and by the use of the points of the shears a pocket-shaped subcutaneous wound about one half ctm. deep was made in this cut. Into this little skin pocket a little piece of the inoculating substance, varying in size from a grain of millet to a mustard-seed, was pushed in as deeply as possible. On the following day the inoculation wound always appeared closed and showed no reaction. Usually a noticeable swelling of the lymph-glands lying next to the point of inoculation, usually of the inguinal glands on one side, first appears after two weeks and at the same time a harden-

\*Syringes of this construction are furnished by H. Windler, court instrument maker, Berlin, N. W. Dorotheenstrasse 3.

ing and knot-forming showed itself upon the up-to-that-time completely healed inoculation-wound. After this the enlargement of the lymph-glands increased rapidly, often to the size of a hazel nut. The knot at the point of inoculation then mostly broke out and covered itself with a dry crust, under which was a flat abscess not discharging much pus and provided with a caseous base. The animals then began to grow emaciated, to have rough hair and difficulty in breathing and died usually from the fourth to the eighth week, or were killed within this period. Also in the case of rabbits the inoculating substance was a few times put into a pocket-shaped skin-wound. But since the course of the disease did not run so precisely and so quickly after the subcutaneous inoculation as was the case with guinea pigs, I afterwards chose the anterior eye chamber as the point of inoculation in rabbits. The course of the iris-tuberculosis arising in consequence of this inoculation has been described often and therefore does not need a special description. The following inoculations were carried out in this manner:

1. *Miliary tuberculosis*.—Tuberculous knots of the pia mater, very rich in tuberculous bacilli: six guinea pigs. Of these one died in five weeks, two in six weeks, two in seven weeks after the inoculation. The sixth was killed in the eighth week. In all the animals the lungs, liver and spleen were tuberculous in a high degree and the inguinal glands were caseous.

2. *Miliary tuberculosis*.—Grey little knots of the lung, quite rich in tuberculous bacilli: six guinea pigs. Three died in the sixth week, the others were killed a few days later. All tuberculous as in No. 1.

3. *Miliary tuberculosis*.—Grey yellow knots from the spleen and kidney, not very rich in tuberculous bacilli: six guinea pigs. Died in the sixth and seventh week. All tuberculous as in No. 1.

4. *Miliary tuberculosis*.—Grey knots of the lung, quite rich in bacilli: three guinea pigs. Two died in the sixth, one in the seventh week. All tuberculous as in No. 1.

5. *Miliary tuberculosis*.—Grey knots of the lung containing few bacilli; five guinea pigs, two rabbits at the "root of the ear." One guinea pig died after eight weeks, the others were killed a few days later. All tuberculous. The rabbits killed after ten weeks had caseous lymph-glands at the root of the ear and on the neck, quite a number of grey little knots in the lungs and some knots in the kidneys and in the spleen. Five guinea pigs were inoculated with tubercles from the spleen of one of the guinea pigs. Of these three died in the eighth week, the other two were killed in the same week and all found tuberculous. Further, the caseous gland substance of the rabbits rubbed in water, was injected into the belly cavity of two rabbits. When these animals were killed eight weeks later, tuberculosis of the omentum, spleen and liver existed as also quite a number of grey knots in both lungs.

6. *Caseous pneumonia and tuberculosis of the brain-membranes*.—Two guinea pigs with the bacilli-rich lung-substance, one guinea pig with a piece of the tuberculously infiltrated and bacilli-rich pia mater. The animals died in the fifth and sixth week. Both tuberculous.

7. *Caseously infiltrated lung*.—Six guinea pigs. The first died after six weeks. The others were already very sick and were killed on the following day. All tuberculous.

8. *Phthisic lung with vomica, intestinal abscesses and caseous mesentric glands.*—With the contents of one vomica, which contained quite a number of bacilli, two guinea pigs were inoculated, and four with the very bacilli-rich substance of the mesentric glands. The last died in the course of the fifth and sixth weeks, of the first two one died in the sixth week, the other was killed a few days later. All tuberculous.

9. *Caseous bronchitis and intestinal tuberculosis.*—With the moderately bacilli-rich lung substance, five guinea pigs were inoculated. Two of them died in the eighth week; the others were killed before the end of the same week. All tuberculous.

10. *A phthisic lung containing vomica.*—With thickened lung tissue which contained a few bacilli, four guinea pigs were inoculated. Of these, three died in the seventh and eighth weeks, the last not until the twelfth week. All tuberculous.

11. *Phthisic sputum.* More or less bacilli-rich sputum freshly taken from three different sufferers from phthisis was inoculated at different times into nine guinea pigs. The animals died, part before the eighth week, the others were then killed. They were all tuberculous.

12. *Phthisic sputum dried for two weeks.*—Three guinea pigs. Two died in sixth week, third was then killed. All tuberculous.

13. *Phthisic sputum dried for two months.*—Three guinea pigs. Killed after five weeks and found with tuberculosis in lungs, liver and spleen.

14. *Tuberculosis of the uterus and "tuben."*—Caseous substance from the tuben inoculated into six guinea pigs. Two animals died after seven weeks. The others were killed in nine weeks. All tuberculous.

15. *Pus from a tuberculous abscess of the kidneys.*—Two guinea pigs were sub-cutaneously inoculated with it, and two suffered an injection into the cavity of the belly. The animals were killed after five weeks. In the guinea pigs sub-cutaneously inoculated, the inguinal glands were swollen and beginning to be caseous; in the enlarged spleen were numerous, in the lungs few, little grey knots. The injected guinea pigs had many tuberculous knots on the peritoneum and in the omentum; spleen more strongly tuberculous than in the inoculated animals, also larger and more numerous tubercles in the lungs.

16.—*Pus from a congestion-abscess occasioned by aortæ-caries.*—Five guinea pigs received from it an injection into the belly cavity. The same boiled distilled water which served for thinning the pus was injected into the belly cavity of one guinea pig which served as control-thier (animal to prove whether association with infected animals would give the disease). This animal was left in the same cage with the others. The animals were killed in the seventh week. The "control-thier" had not a trace of tuberculosis either in the belly cavity or in the lungs. The animals into which the pus was injected showed a remarkably fine tuberculosis of the peritoneum and of the omentum, besides this also a more or less advanced tuberculosis of the spleen and lung.

17.—*Fungous elbow-joint*—Substance with very few bacilli inoculated into four guinea pigs. Killed in the tenth week. All tuberculous.

18.—*Scrofulous glands* from three different cases inoculated into ten guinea pigs at different times. The inoculating substance contained few bacilli and cor-

responding with this the tuberculosis ran its course much more slowly. Nevertheless also in these animals, the swelling, the first noticeable symptom of disease, and the later caseous degeneration of the inguinal glands, leave no doubt that the place of inoculation formed the point of entrance for the tuberculous virus. Four of the animals died from the tenth to the twelfth week, the others were then killed. In all the lymph glands in the neighborhood of the place of inoculation were caseous, and the spleen, liver and lungs tuberculous to a marked degree.

19.—*Scrofulous gland*.—The gland substance, poor in bacilli, transferred into the anterior eye chamber of four rabbits. In all four animals in the course of the third week, tuberculosis of the iris began to develop and lead to caseous degeneration of the bulbus. In the tenth week the rabbits were killed and beside the destruction of the bulbus, caseous degeneration of the neck lymph-glands and numerous grey knots were found in the lungs.

20.—From five different cases of *lupus* eighteen rabbits were inoculated in the anterior eye-chamber. The course of the disease corresponded exactly with that described in No. 19. An iris-tuberculosis at first developing slowly, gradually leading to caseous degeneration and suppuration of the bulbus and finally to general tuberculosis. The inoculation was without results in the case of one of the rabbits. Some were killed just when the iris-tuberculosis had developed, others after the swelling and caseous degeneration of the neck-glands had appeared; still others finally died with wide-spread tuberculosis of the lung, liver, spleen and kidneys. As well in the tubercles of the iris as in the tuberculously altered glands, lungs, etc., tuberculous bacilli were proved more or less abundantly. From a sixth lupus case three guinea pigs, and from one of the above mentioned cases five guinea pigs were subcutaneously inoculated. In these animals also there were swelling and caseous degeneration of the inguinal glands. They died in the seventh to the eighth week after the inoculation, were tuberculous in a high degree, and had numerous tuberculous bacilli\* in the lungs, spleen, liver and kidneys.

21. *Lung affected by "perlsucht"* partially calcareous knots with quite numerous bacilli, inoculated into eight guinea pigs. These died within five to eight weeks and were all tuberculous in a high degree. From one of these guinea pigs four others and from a second three others were inoculated. Of these animals also five died in the sixth and seventh week, the last two were killed in the eighth week. In all these also tuberculosis was found. Further: From the "perlsucht" lung used in these attempts, a cat was inoculated and died after seven weeks, tuberculous. A second cat inoculated with lung tubercles from this animal after six weeks appeared emaciated and short-breathed. She was killed and found to have numerous tubercles in the lungs and spleen.

22.—A "perlsucht" knot from the peritoneum inoculated into six guinea

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\*Lately Demme, Pfeifer and Dontrelepont have made communications relating to the occurrence of tuberculous bacilli in lupus-skin and in the tubercles of animals inoculated with lupus. My investigations in regard to lupus, which include not only the proof of bacilli in lupus skin and in inoculation tubercles, but also long continued "rein-culturen" of lupus-bacilli and successful inoculation undertaken with them, had been concluded for several months, when those communications were published, so that these could have had no influence upon my work.

pigs. Three of them died in the fifth and sixth weeks, the others were killed some days later. All tuberculous.

23. *Perlsucht knot from the lung*, partly with caseous contents, and not very rich in bacilli. Seven guinea pigs. Five of them died up to the seventh week. The last two were killed in the eighth week. All tuberculous.

24. *Calcareous perlsucht knot from the peritoneum* with many bacilli. Three guinea pigs; these died up to the sixth week. All tuberculous.

25. *Caseous pneumonia of pig*.—Thickened, very bacilli-rich lung tissue. Five guinea pigs. These died in the fifth and sixth week and were tuberculous.

26. *From the lung tubercles of a rabbit* which died of spontaneous tuberculosis, four guinea pigs were inoculated. Two of these died in the seventh week, two were killed in the eighth week. They were all tuberculous. Four guinea pigs were again inoculated from the first of these animals, two guinea pigs and four rabbits from the second, two rabbits from the third, and one guinea pig and one rabbit from the fourth. The guinea pigs were inoculated subcutaneously, the rabbits in the anterior eye-chamber. The guinea pigs died up to the seventh week of tuberculosis, the rabbits all were attacked with iris-tuberculosis; two died in the ninth and tenth week of tuberculosis, the others were then killed and more or less lung tubercles were found in them.

27. Two guinea pigs and two cats were inoculated with *lung tubercles from a monkey*, which died of spontaneous tuberculosis. The two guinea pigs died in the sixth week, one cat in the seventh, the other after thirteen weeks. All tuberculous. Six guinea pigs and one rabbit (in the anterior eye-chamber), were then inoculated from one of the guinea pigs and these were all found to be tuberculous before the eighth week (partly died, partly killed). Finally from two animals of this second group the tuberculosis was reinoculated into seven other guinea pigs with success. Also from one of the cats four guinea pigs were successfully inoculated. It is still to be mentioned that four guinea pigs were inoculated with the spleen of this monkey, which had been dried fifty-six days and with the lung tubercles of the same, which had lain fifty-seven days in absolute alcohol. These animals for four months showed no change, were then killed and proved themselves free of tuberculosis.

28. *From a second monkey* which died of spontaneous tuberculosis two guinea pigs were inoculated with lung tubercles and died of tuberculosis in the eighth and ninth weeks. Further: from these guinea pigs two guinea pigs and one rabbit were inoculated. As these appeared already diseased in the sixth week, they were killed and found tuberculous. Two guinea pigs were inoculated with lung tubercles of the same monkey which had been dried and preserved three days. These animals were also killed in the sixth week and found tuberculous.

These experiments in inoculation which have just been enumerated were made upon one hundred and seventy-nine guinea pigs, thirty-five rabbits and four cats, and the inoculation had as a consequence tuberculosis in every case without exception. Moreover the presence of tuberculous changes did not confine itself to single knots of a doubtful nature in one or the other organ, but in every single case the tuberculosis could be proved with all the certainty wished, first, by the development of the characteristic symptoms of the disease, such as swelling of the

glands, caseous ulceration of the point of inoculation, emaciation and difficulty of breathing; second, in dissection by the far advanced and very considerable pathological changes proceeding from the point of inoculation into the neighboring lymph glands and into the lungs, spleen and liver. Moreover, under microscopic examination the characteristic tissue elements of the tubercle and the presence of tuberculous bacilli was always proved. The manner in which the inoculation tuberculosis conducted itself in the different animals and in the different organs has already been described in detail.

Other experimenters have had less favorable results from their inoculations with tuberculous substance. On the other hand the regularly favorable results obtained by me will appear less striking when it is considered that I never used material in which tuberculous bacilli could not be proved, and that for my inoculations I always used those species of animals which are especially disposed to tuberculosis. Besides this, the fact that the inoculations were carried out with all possible care and exactness may have contributed not a little to the results. One might consider it an omission that no attempts were made with the inoculation of non-tuberculous substances. Nevertheless it did not appear to me necessary to make such attempts myself, because, during the course of my investigations, inoculation with the most manifold substances containing no tuberculous bacilli were made by the hundred in the same rooms, and moreover on guinea pigs and rabbits, and a tuberculosis traceable to the inoculation was never found. Especially was non-tuberculous material very often put into the anterior eye-chamber and not a single time did tuberculosis of the iris result, while after the inoculation with genuine tuberculous masses it never failed to appear. Besides, the abortive inoculations made with the lung tubercles of the monkey, which tubercles had been dried and preserved in alcohol, described in No. 27, form to a certain extent such attempts, for plainly by the death of the bacilli the tubercles had lost their virulence. The attempt was, therefore, an inoculation with different material.

My attempts, therefore, justify me in the conclusion that only the inoculation with bacilli-bearing substances can cause genuine tuberculosis in the animals used for experiment. A distinction in the effect of inoculation from material coming from tuberculous processes of various kinds, (such as miliary tuberculosis, phthisis, scrofula, fungous diseases of the joints, lupus, perlsucht, and other forms of animal tuberculosis) I have not been able to discover. But also in this regard the various sorts of tuberculosis show a perfectly uniform behavior.

#### F.—EXPERIMENTS IN INFECTION WITH REINCULTUREN OF TUBERCULOUS BACILLI.

This second group of infection experiments forms the conclusion of the proof that tuberculosis is an infectious disease and that it is conditioned upon tuberculous bacilli. Up to this time it has been proved that tuberculous bacilli occur in all tuberculous disease processes and exclusively in these. Further, that only tuberculous bacilli-bearing substances have the power of causing tuberculosis. But since in both cases the bacilli were still united with parts of the body, the supposition was justified that besides the bacilli still another material of importance, perhaps even the real infectious material, might be present while the bacilli played

only a secondary part. This question could only be decided by inoculating the bacilli perfectly pure and separate from all parts of the body. If they then also created tuberculosis, they must be the only and indisputable infectious material of tuberculosis. The high importance which belong to just this part of the investigation demanded that the strictest prudential measures should be taken to exclude all errors. With regard to this, as in the former attempts, for every single experiment several freshly bought animals were used. Besides this special counteracting attempts went along with most of the attempts. The animals of every experiment were in a special cage and were strictly separated from all other tuberculous ones; they were also killed as early as possible to prevent a collision with spontaneous tuberculosis and any objection arising therefrom. Further, as various methods of infection as possible and as various species of animals were used in order to find out the working of the reinculture in this direction. The greatest care was used in the disinfection of all the vessels and instruments used, especially the syringes. The culture serving for infection consisted (as was specially proved almost every time), wholly of tuberculous bacilli. The same were lifted with all caution by means of platinum wires heated until red from the stiffened blood serum, which, as has already been expressly mentioned, can easily be done without tearing off the least bit of the blood serum. It is therefore not too much to claim that in most of the attempts absolutely pure bacilli masses were used to which nothing of the breeding ground on which they grew clung. Moreover, in several attempts sterilized blood serum was injected into the animals, which served for the counteracting attempts without the appearance of a trace of tuberculosis. One can therefore claim with all certainty that when genuine tuberculosis is caused by the infection with a tuberculous bacilli-reinculture, which has been continued through several successive breedings, this is to be ascribed alone to the effect of the tuberculous bacilli.

First experiment: Reinculture of miliary tubercles of the human lung (No. 22 in the former enumeration of the reincultures) cultivated through five successive breedings for fifty-four days, subcutaneously inoculated into four guinea pigs. Two animals in the same cage were not inoculated. In the inoculated animals after fourteen days the inguinal glands swelled, the places of inoculation changed into abscesses and the animals began to grow emaciated. One of them died after thirty-two days, the others were killed on the thirty-fifth day. The inoculated guinea pigs, as well the one which died as the three which were killed, showed tuberculosis of the spleen, liver and lungs to a high degree; the inguinal glands were greatly swollen and caseous, and, moreover, decidedly more so on the inoculated side; the bronchial glands were little swelled. The two uninoculated animals showed no trace of tuberculosis.

Second experiment: Reinculture from the tuberculous lung of a monkey, (No. 11) cultivated ninety-five days in eight successive breedings, inoculated subcutaneously into six guinea pigs. Two animals for counter-experiment remained uninoculated. All the animals were killed after thirty-two days and the six inoculated were found tuberculous to a high degree, the two others healthy.

Third experiment: Reinculture from a perlsucht lung (No. 37) cultivated for seventy-two days through six successive breedings, subcutaneously inoculated into five guinea pigs; one animal remained uninoculated. When the animals

were killed after thirty-four days the inoculated showed themselves tuberculous, the uninoculated healthy.

Fourth experiment: Reincultur from the tuberculous lung of a monkey (No. 11), cultivated 113 days in nine successive breedings, subcutaneously inoculated into two guinea pigs, one German marmot, six white rats, five white mice, four field mice, two hedge hogs, six domestic fowls, four doves, two sparrows, three eels, one goldfish, five frogs, one turtle. Of these animals only the guinea pigs, the marmot and the field mice became noticeably sick. These were killed fifty-three days after the inoculation and all found tuberculous to a high degree. The tuberculosis of the marmot has, according to all appearance, a very great resemblance to that of the guinea-pig. The spleen is very much enlarged and has a greyish-red marbled appearance, also the liver appears permeated by large yellowish herds. The tuberculously changed organs of the field mouse also look very characteristic. The inguinal glands are considerably enlarged and caseous, the lungs permeated by numerous grey knots from the size of a poppy-seed to the head of a pin, and liver and spleen permeated very uniformly with many whitish tubercles as large as a grain of millet, so that these latter gained a very dainty sprinkled appearance. All the other animals of this experiment were killed two months later and it appeared in their investigation, that one of the five white mice had some grey knots in the lungs, the others were healthy, as were also the rats and the hedge hog. Of the domestic fowls, three had the large tuberculous knots in the intestines and in the liver characteristic of this species of animals. The rest of the animals were healthy.

Fifth experiment: Reincultur from the closed vomica of a phthisic lung (No. 26), cultivated for twelve months in sixteen successive breedings and subcutaneously inoculated into seventeen guinea pigs, two other animals remaining uninoculated. With these animals observations were made as to the effect of means which have the power of hindering the development of the tuberculous bacilli and they could therefore not be killed. In spite of the fact that partly arsenic, partly carbolic acid had been used to the greatest possible extent, the tuberculosis ran its course just the same as in the former animals, the lymph-glands swelled considerably, emaciation occurred, all the animals died in the fourth to the sixth week and were tuberculous in a high degree. The two uninoculated animals were then killed and found healthy.

Sixth experiment: The following reinculturen, first, from lupus (No. 35) in eight successive breedings continued for five months; second, from a fungous joint (No. 34) in seven successive breedings for four months; third, from a scrofulous gland (No. 29) in seven successive breedings for five months; fourth, from miliary tuberculosis, (No. 22) in twelve successive breedings for nine months; fifth, from the vomica of a phthisic lung (No. 25) in nine successive breedings for six months; sixth, from a perlsucht knot (No. 39) in eleven successive breedings for nine months—were subcutaneously inoculated, and, moreover, from every one of the culturen four animals were inoculated. The mice were put in twos into roomy glasses. Some animals died after a few days, apparently in consequence of the influence of the imprisonment. All the others visibly grew ill, the inguinal glands began to swell, the animals became emaciated and suffered from difficulty of breathing. In the course of four to six weeks they all died. The examination

of some of these animals was utterly prevented or only incompletely possible, because the still living field-mice, in spite of having abundant vegetable food, often gnawed their dead comrades and ate up the inner organs of the same with great ravenousness. Nevertheless, from each single division of this experiment some animals remained for examination, and it could therefore be determined that they all perished from a high degree of tuberculosis of the lungs, liver and spleen. A distinction in the conduct of the tuberculosis proceeding from the various reincultures was not to be recognized. The general appearance of the pathological changes was identical in all animals and so was the appearance of the single little knots to the naked eye, as well as their microscopic conduct and especially their tuberculous bacilli contents. For this experiment it is worthy of notice that the animals had been in imprisonment only a few days when they were inoculated, and that a large number of other field-mice under the same conditions had been kept in glasses for months without a single one of them becoming tuberculous.

Seventh experiment: Since field-mice are such a sure and convenient reagent for tuberculosis, for the purpose of experiments which I made with Dr. Gaffky twenty-four field-mice were subcutaneously inoculated with the reincultur from a phthisic lung (No. 1) cultivated for seven months in twelve successive breedings. These experiments were made in regard to the influence upon tuberculous animals of substances hindering the development. Also from these animals, which were treated with inhalations of easily evaporating substances, some died after a few days of pneumonia, tuberculosis developed itself in all the other, and ran its course in the same way as in the mice of the previous experiment. Under dissection, a well-marked tuberculosis of the lungs, spleen and liver always showed itself.

Eighth experiment: For the same purpose five guinea pigs were inoculated with reincultur from caseous pneumonia (No. 28) cultivated for six months in eight successive breedings; further, four guinea pigs with reincultur from a phthisic lung (No. 24) cultivated for six months in ten successive breedings, and six guinea pigs with reincultur from tuberculosis of the testicles (No. 33) cultivated for three months in five successive breedings—all subcutaneously. These animals had also various gas-like development-hindering substances to breathe in, but in spite of it became sick and emaciated, died within four to six weeks and were under dissection all found tuberculous.

Ninth experiment: Reincultur of lupus (No. 35) cultivated for twelve months in fifteen successive breedings subcutaneously inoculated into five guinea pigs. This experiment was undertaken in order to see whether the continuation of the cultur of tuberculous bacilli from lupus-skin for the space of a whole year had any influence upon the virulence of the same. This was, nevertheless, not the case. The inoculated animals were taken sick just as surely and quickly as in the former experiments; two died in the fourth week, the others were then killed and all found under dissection to be tuberculous in a high degree.

Tenth experiment: With the same intention the longest continued reincultur (No. 1) of human lung phthisis, cultivated for eighteen months in twenty-six successive breedings, was subcutaneously inoculated into four guinea pigs. The course of the disease was just the same as in the ninth experiment. The animals died in the fourth and fifth week of the inoculation and were tuberculous.

Eleventh experiment : By former opportunities an essential difference in the sensitiveness of house mice and field mice to inoculation with tuberculosis had shown itself. Again, therefore, twelve white mice were inoculated with a réincultur of miliary tuberculosis (No. 22), the same which had served in the inoculation of the field-mice in the sixth experiment, and, moreover, at the same time as the field-mice. While the field-mice, as has already been said, became tuberculous, the white mice remained for two months without any appearance whatever of sickness ; they were then killed and tuberculous changes found in none of them.

These eleven experiments have the one common feature, that the inoculating substance was put into the animals subcutaneously. The effect was in general the same as when fresh tuberculous pieces of tissue were inoculated subcutaneously. The little skin wound closed up and healed in the first days, then followed gland swelling, emaciation, death, and dissection showed a great far-reaching tuberculous eruption in lungs, spleen and liver, with the further characteristic changes of these organs belonging thereto. Only in so far a distinction was noticeable as that after inoculation of the reinculturen the course of tuberculosis was a more rapid one, than after the inoculation of tuberculous tissue. For guinea pigs this difference in time can be reckoned on the average as about two weeks. This appearance explains itself most naturally by the assumption that in the inoculation of tuberculous tissue, the tuberculous bacilli are enclosed by the latter and cannot, therefore, have their effect until the tissue is resorbed, while those in the reinculturen can get immediately into the subcutaneous tissue of the animal, and can immediately begin to act. The same is the case in the inoculation of the anterior eye-chamber of rabbits, and the iris-tuberculosis arising from it, and it is here the case to a more striking degree because the developement of the tubercles can here be observed with the naked eye. Microscopically the tubercles obtained by the inoculation of reinculturen resemble in every way those obtained by the inoculation of genuine tuberculous tissue, and just the same the tubercles arising spontaneously. They consisted of heaps of cells, which mostly had the character of epithelioid cells and closed giant cells, and contained besides these, tuberculous bacilli in greater or less numbers. Their virulence could be seen from the fact, that in all cases they had spread themselves out from the subcutaneous tissue over all the organs favored by tuberculosis. Besides this, in several cases, farther inoculations were carried out upon other animals and tuberculosis regularly created thereby. The inoculation of the reinculturen remained without effect only in some species of animals, little or not at all sensitive to tuberculosis. On the contrary it made the other numerous animals tuberculous without exception, and as, besides this, all the animals used for counter-experiments remained healthy, there could be no doubt that the question for the decision of which these experiments were undertaken, must be answered in the affirmative, and that the tuberculous bacilli are to be considered the sole cause of tuberculosis.

Nevertheless, it seemed necessary not to stop here, but also to introduce the reinculturen of tuberculous bacilli into animals by all the other methods of infection used up to this time in investigations regarding tuberculosis, in order so to prove in every direction their identity with the tuberculous virus. The methods

used up to this time were the following: Inoculation into the anterior eye-chamber of rabbits, injection into the abdominal cavity, injection into one of the larger veins, inhalation of reincultur of tuberculous bacilli.

#### INOCULATION OF REINCULTUREN IN THE ANTERIOR EYE-CHAMBER.

A cut several millimeters long was made in the cornea, and, moreover, on the upper border of the same, and by means of a blunt hook as small a crumb as possible of a reincultur was pushed through this into the anterior eye-chamber of a rabbit. Some practice and patience are required for this, and on this account I afterward followed another method. The cultur, rubbed to pieces in distilled water, was taken into a syringe, whose needle must be very fine and sharp. The point can easily be pricked through the cornea into the anterior chamber, and the liquid can then be injected into it. This last method is so far more favorable as that the quantity of the infectious material can be very easily controlled. One sees plainly, in moving the piston of the syringe, how the cloudy injecting fluid mingles with the aqueous humor in the eye chamber, and one can inject much or little liquid as he will. A minimum of bacilli can be brought into the anterior chamber, if the needle of the filled syringe be put into it, and without a real injection be taken out again, since traces of the liquid in the needle mix with the water of the chamber, even if the piston of the syringe be not set in motion.

Twelfth experiment: Little crumbs of a reincultur from a caseous-pneumonic lung (No. 27) cultivated for three months in five successive breedings, were put into the anterior eye-chamber of three rabbits. After a few days an intense iritis developed, the cornea soon became cloudy and yellowish gray. The animals then became emaciated very rapidly. They were killed after twenty-five days, and beside the caseous-purulent destruction of the bulbus, swelling and caseous degeneration of the lymph-glands of the lower jaw and of the base of the ear, very numerous tuberculous knots, partly with whitish centres, were found in the lungs.

Thirteenth experiment: Reincultur from a perlsucht lung (No. 19) cultivated for three months in five successive breedings, was rubbed with sterilized blood serum, and injected into the anterior eye-chamber of two rabbits. A third rabbit received just such an injection of pure blood serum. In the case of the first rabbits the same appearances as in the twelfth experiment occurred. Iritis quickly running its course, and cloudiness of the cornea in a few days. The eyes of the third rabbit showed no change. The animals were killed after twenty-eight days. The rabbit into whose eye the pure blood serum had been injected showed itself perfectly healthy; the other two had caseous bulbi, swollen lymph-glands provided with caseous spots on the lower jaw and beside the base of the ear, and numberless tuberculous knots in the lungs.

Fourteenth experiment: Four rabbits concerned. Pure blood serum was injected into the anterior eye-chamber of the first. The needle of the syringe, which contained blood serum with an addition of reincultur (from tuberculosis of monkey No. 12, cultivated four and one-half months in eight successive breedings) was put into the anterior eye-chamber of the second, but the piston was not moved; several drops of blood serum mixed with reincultur were injected into the anterior eye-chamber of the third and fourth rabbits. In the case of these last two animals

there developed iritis suppuration of the bulbus, followed by rapid emaciation. In the case of the second rabbit, on the contrary, the eye remained unchanged in the beginning and not until the second week did there appear single white yellowish knots on the iris in the neighborhood of the point of injection, and proceeding from this a typical iris tuberculosis developed itself. New little knots constantly appeared on the iris, the iris laid itself into ray-shaped folds, but the cornea gradually became cloudy and thereby hid the other changes from view. The animals were killed after thirty days. The first was perfectly healthy; in the second, aside from the already mentioned changes in the eye, the lymph-glands on the jaw were found swollen and permeated with yellow-white herds, the lungs and other organs were still free from tuberculosis. The two last rabbits had again numberless tubercles in the lungs.

Fifteenth experiment: Reincultur of miliary tubercles from a human lung (No. 4) cultivated for four and one-half months in eight successive breedings, was rubbed up with blood serum and the needle of a syringe filled with it and pricked into the anterior eye-chamber of six rabbits without, however, making an injection. In all the animals iris tuberculosis developed, in some of them a slowly spreading infiltration of the conjunctiva with tuberculous knots, reaching beyond the neighborhood of the point of inoculation. Two of the animals of this experiment killed after four weeks had already caseously infiltrated lymph-glands on the neck, but still no tubercles in the lungs. The other rabbits were killed after eight weeks and more or less numerous tubercles were then also found in the lungs.

At various times rabbits received injections of reinculturen in the anterior eye-chamber in order to test the influence of substances, which hinder the development of tuberculous bacilli in these animals. Of these attempts which, as has already been mentioned, I carried on with Dr. Gaffky, a report will be given on a later occasion. It may be said here in passing, that beside numerous other means, arsenic,\* helenin, sulphuric hydrogen, and moreover always in the largest possible doses and for weeks at a time, were used upon the animals. We cannot state a favorable effect of one of these means in a single case. All the animals perished tuberculously just as quickly as those which had not been treated with means hindering development. The infection took place in various ways; partly by simple inoculation (comp. experiments 7 and 8) partly by injection into the eye-chamber, partly by injection into a vein. The rabbits infected from the eye-chamber concern the following cases:

Sixteenth experiment: Reincultur of miliary tubercles of the human lung (No. 22) cultivated for eight months in ten successive breedings, rubbed up with distilled water and injected into the anterior eye-chamber of two rabbits; Reincultur from a phthisic lung (No. 1) cultivated for thirteen months in twenty-one successive breedings, injected in the same way into fifteen rabbits. Some of the same reincultur one month later injected into six rabbits. All these rabbits perished

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\* The use of arsenic to fight tuberculosis has been often recommended in former times and tried by many physicians. It was therefore natural to test the influence of this on tuberculous animals. Our experiments occurred almost a year before the recommendation of arsenic by Buchner appeared, and were, therefore, not induced by that. According to Korab, helenin has prevented tuberculosis and sulphuric hydrogen was warmly recommended by Froschauer.

quickly with the already described symptoms and had always numerous tuberculous knots in the lungs.

In all the cases of these experiments, in which very small quantities of the reincultur were successfully brought into the anterior eye-chamber, the effect was exactly the same as after the implantation of the natural tuberculous virus in the anterior eye-chamber. Single tuberculous knots appeared in the iris, which increased in number and led to caseous degeneration of the bulbus and finally to general tuberculosis. In so far, to be sure, a distinction existed in that the eruption of little knots occurred earlier than after the inoculation with tuberculous tissue. The probable ground of this appearance has already been discussed. A very noteworthy fact has been gained from the experiments, namely, the considerable difference in the effect according as a small number of bacilli or a large quantity of the same get into the eye-chamber. In the first case we see a process slowly creeping on, in which the infectious material first spreads itself upon the iris, then reaches the lymph-glands, makes these caseous and not until then forcing itself into the course of the blood and so becoming sowed over other organs of the body. If, on the contrary, a large number of bacilli are in the beginning deposited in the anterior eye-chamber, then it has an appearance suggesting that the before-mentioned way is unnecessary. Especially it appears as if the lymph-glands, which usually offer an opposition to the progress of the bacilli and hold them fast for a longer or shorter time, were passed over altogether. The appearance of very numerous tuberculous knots in the lungs, spleen, etc., occurs as early in this mode of infection as after the injection of tuberculous bacilli immediately into a vein. Also the quantity of the little knots after the injection into the anterior eye-chamber does not compare very unfavorably with the quantity of them after injection into the course of the blood. Now whether the explanation of this is to be sought therein, that the bacilli of the anterior eye-chamber can really in any way come direct into the course of the blood in quantities, or whether their great number, which suddenly overflows the lymph passages and glands lying before us, causes most of the bacilli to break through the hindrance, so that only a few remain, that I must leave undecided. At all events this appearance is adapted to give enlightenment as to the apparently inexplicable irregular conduct of tuberculosis with reference to the duration of its course and to the longer or shorter local confinement.

#### INJECTION OF REINOCULTUREN INTO THE ABDOMINAL CAVITY.

The reinculturen, rubbed up with blood serum or distilled water, were filled into a disinfected syringe, the point of operation on the abdomen of the animal was disinfected with sublimate solution, and then the needle slowly driven through the covering of the abdomen so that the intestines remained unhurt, and then the liquid was squirted into the abdominal cavity. This of itself very simple operation can easily be performed upon animals whose intestines are not constantly filled with firm, unyielding matter, and I have always succeeded with guinea pigs, rats, mice, cats, etc., without causing injury to the intestines or traumatic peritonitis. Rabbits are less adapted for this experiment on account of the closely filled cœcum. In order to obtain as quick an effect as possible, considerable masses of reincultur were always injected. The abdominal cavity, like the eye-chamber,

reacts differently according to the different quantities of tuberculous virus. After an injection of pus containing few bacilli there arose on the peritoneum, as we have already seen, a disseminated tuberculous eruption, then a development of little knots in the omentum and the spleen. But when masses of tuberculous bacilli were injected into the abdominal cavity of guinea pigs, then they were principally taken up by the large omentum. This rolls itself together and forms a horizontally-extending, thick, sausage-like roll, which on intersection has the greatest resemblance to an intersected, greatly swollen, and freshly caseous lymph-gland. In these white-yellowish, quite compact herds of the omentum enormous quantities of tuberculous bacilli are found, most of which are in a fine state of spore formation. Besides this, as microscopic investigation shows us, the swollen spleen, the liver and the peritoneum are abundantly supplied with tuberculous bacilli, but the death of these animals occurs so early that the development of knots visible to the naked eye has not had time to occur. An effusion of liquid was not found in the abdominal cavity of guinea pigs, but was found in dogs and cats. On the contrary, in guinea pigs, such a large quantity of clear, faintly yellow liquid was found in the pleura that the lungs were compressed by it, and this caused the death of the animal. The guinea pigs usually died ten to twenty days after the injection. If a smaller quantity of cultur substance is squirted in, the course of the disease is of longer duration and there is then a development of visible, extraordinarily numerous tuberculous knots, particularly upon the peritoneum, on omentum, in the spleen and liver. The species of animals less subject to tuberculosis—dogs, rats, white mice—do not succumb even to the injection of abundant bacilli until after some months. But they then show also an unusually abundant tuberculous eruption in the abdominal organs, but, on the contrary, less numerous knots in the lungs.

Seventeenth Experiment: Reincultur from the tuberculous lung of a monkey (No. 11) cultivated for six months in eleven successive breedings, was rubbed up with blood serum and injected into ten guinea pigs, a half cubic centimeter into each. Two animals for counter experiment received, the one just such an injection of pure blood serum, the other, which had a fresh, large wound from a bite, no injection at all. Of the animals which had received the injection, deaths occurred after ten, thirteen, sixteen, seventeen, eighteen days. The others, as well as the "controlthiere\*" were killed on the twenty-fifth day. In the guinea pig which died first the large omentum was rolled together, greatly thickened, and infiltrated with a yellowish-white brittle substance; no knots were visible on the liver and spleen. The other animals of this experiment, as well those which died as those which were killed, had, besides infiltration of the omentum, already tuberculous eruption of the spleen and liver. The controlthiere were perfectly healthy.

Eighteenth Experiment: Reincultur of the tuberculous lung of a monkey (No. 11) cultivated for five and one-half months in ten successive breedings, rubbed up with blood serum, was injected into the abdominal cavity of two full grown vigorous cats. The one cat died after nineteen days. The omentum was rolled together, very much thickened, and infiltrated with a whitish compact mass. The serous covering of the intestines and the peritoneum had lost its lustre, the

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\* Animals for counter experiment.

spleen was greatly enlarged. The infiltration of the omentum consisted, as in the guinea pigs of the previous experiment, of thick masses of tuberculous bacilli, embedded mostly in cells. With the naked eye no knots could be seen in the lungs, spleen and liver, but microscopically these organs were permeated already by an unusually abundant tuberculous eruption. The second cat was killed after forty-three days, and there were already tuberculous knots as large as a millet seed in great numbers, quite uniformly spread over the lungs, spleen and omentum, while in the liver the number was comparatively small. Both cats were to have received a syringe-full of the injecting liquid, therefore an equal quantity, but the second was very uneasy during the operation and only a small part of the liquid could be successfully injected; on which account the tuberculosis had a considerably longer course, and fewer tuberculous knots developed which had time to reach a considerable size.

Nineteenth Experiment: Reincultur of miliary tuberculosis (No. 22) cultivated for three months in five successive breedings, rubbed up with blood serum, and two cubic centimeters of this liquid injected into the abdominal cavity of a female dog several years old. A half cubic centimeter of the same liquid was injected into a male dog some months old. In the first weeks after the injection no change could be seen in the animals. After the third week the female dog lost her briskness, she ate less, and a noticeable swelling of the body occurred. This animal was killed at the beginning of the fifth week. In the abdominal cavity was a quite abundant effusion of a clear, faintly yellowish liquid. The omentum, mesenterium, ligaments of the womb and peritoneum were sprinkled over with many tuberculous knots, as were also the surface of the intestines and bladder. The enlarged spleen, the liver and lungs contained numerous miliary tubercles provided with tuberculous bacilli. The places of injection could no longer be recognized. The second dog appeared sick for a time, had also plainly an effusion of liquid in the abdominal cavity, and became emaciated; finally it recovered and developed very vigorously. This dog, together with a female from the same litter, received five months later an injection from the same reincultur, this time however of two cubic centimeters. The result was the same in both animals: for some weeks they showed no symptoms of disease, then became emaciated and were attacked by ascites. One animal died after five weeks, and then the other, which was already very weak, was killed. The information gained from the dissection was exactly the same as in the case of the first dog. Omentum, peritoneum, spleen, liver and lungs were supplied with extraordinarily many tuberculous knots.

This experiment is in so far of special interest as that one dog after the injection of a half cubic centimeter of bacilli liquid was, to be sure, taken sick, but recovered. This is the only case of tuberculosis in animals which I have seen recover. The hope has often been expressed that, as in the case of inflammation of the spleen, a preventive inoculation with weakened virus might be used against tuberculosis. But if one recovery from tuberculosis gives protection against a second attack of the disease, for which, by the way, experience by the sick bed gives no ground of hope, then this dog should have had immunity against further experiments in infection. But this was not the case, and this circumstance speaks against the justification of such hopes.

*(To be continued.)*

## REPORTS OF CASES.

*"Careful observation makes a skillful practitioner, but his skill dies with him. By recording his observations he adds to the knowledge of his profession, and assists by his facts in building up the solid edifice of pathological science."*—VETERINARY RECORD.

## AMERICAN VETERINARY COLLEGE, HOSPITAL DEPARTMENT.

Cases by J. HÜLME, D.V.S. and R. MORRISON, D.V.S.

## FISTULA COLLI.

A CONTRIBUTION TO THE HISTORY OF SIMILAR LESIONS AND SUGGESTIONS AS TO THEIR CORRECT PROGNOSIS.

Fistulous tracts situated in any portion of the body between the head and the withers, are always serious in their nature, and rarely yield satisfactorily to treatment, and perhaps, of all this class of cases, none are more troublesome than those which occur on any part of the superior cervical region, on account probably of the difficulty of fixing upon a positive diagnosis as to their cause. The following case may prove of interest, and perhaps afford some useful data in the history of similar lesions.

This patient, a government animal, was a good looking bay horse of six years. Some two months previously, a small swelling appeared on the off side of the neck, which was opened, and had been discharging ever since. Caustics of various kinds and under various forms, both liquid and solid, had been used, but without benefit, and he was sent to the hospital, where the wound was carefully examined. It was found to be about two inches long, situated about the middle of the right side of the neck, somewhat below the superior border, and connecting with a tract extending downwards, backwards and inwards, which discharged a quite abundant suppuration, laudable in character, but perhaps a little thin.

On account of the directions of the tract it was decided to make a counter opening, and for that purpose the S probe was introduced and found to pass with but little difficulty from the right to the left side of the neck. A seton was then introduced into the new-made tract, and both openings being

enlarged to allow free escape of pus, the animal was treated by merely washing the discharge twice daily and injecting carbolic solution through the fistula.

This simple treatment was followed during eight days consecutively, with the result of apparent or (perhaps fancied) alternating or fluctuating improvements, followed by a return to the condition of *statu quo*.

The wounds showing a tendency to close, they were then enlarged on both sides, and a fine tubing or hydrant was introduced through the higher one, (that of the right side), and the tract more thoroughly washed, the exit of the water carrying with it in its course, not only pus, but sloughs of diseased tissues. This treatment having been continued for a few days, it was noticed that the neck seemed to become swollen, and the enlargement seemed to involve that entire region of the body. It was not painful to the touch, but seemed merely to render the movement of the animal difficult. This swelling was at first scarcely perceptible, but continued to increase for four days from that of its appearance until it had become quite serious, and being attributed to the infiltration of water during the washing of the tract with the hydrant, this was discontinued, and only the external washing persevered with.

For several days following, the degree of swelling seemed to remain unchanged, but from that time it maintained a downward movement towards the lower border of the neck, diminishing in proportion towards the superior, and then passing to the fore part of the chest, down to the fore legs, when, by degrees, it disappeared.

No change, however, had taken place in the fistula in the neck. There were the same appearances with the same alternating diminution and increase in the amount of the discharge, notwithstanding the modification of treatment, with new setons, caustics, injections, antiseptic washes, etc.

Then, one morning, on dressing the patient, it was observed that on pressing from below upwards, on the right side, the discharge of pus became more abundant, and still more so if the pressure was made on both sides together, and

in the same manner from below upwards, or from behind forwards.

Evidently there was a cavity, a *cul de sac* opening in the fistula, and where at the same time the pus accumulated, but what its depth, situation and capacity might be remained still to be ascertained by further experiment. Accordingly, the opening on the right side was enlarged freely, and the pus being detected oozing between the muscles, a free and deep incision was made, which uncovered a cavity, from which pus and diseased ligamentum nuchæ were washed out. The wound measured about eight inches in length and reached down half the thickness of the neck.

It was now hoped that the bottom of the difficulty had been reached, and strong expectations of effecting a cure were entertained, when official orders were received for the destruction of the patient, which, of course, were executed.

At the post mortem, which could not be made as thorough as was desirable, it was found that even with that deep incision and a free use of the bistoury, the bottom of the trouble had not been reached, as several fistulous tracks were detected, one amongst them being larger than the others, and running all the way down along the ligament nuchæ which was diseased between that and the complexus major muscle until it reached the base of the neck, near the dorsal region, a condition which most undoubtedly would have proved rebellious to any form of treatment.

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#### PROLAPSUS UTERI IN A BITCH.—AMPUTATION.

The patient, a handsome large mastiff bitch, about twelve months old, had been placed in a stable, to be lined by another of her breed. Both dogs were tied up, but were too far apart to allow of contact. The following morning the bitch was found with prolapsus uteri, and was the same afternoon sent to the hospital. Indeed, when she was admitted she showed her vulva dilated by a round, red, fleshy swelling, protruding somewhat outwards. Slight pressure returned the organ to its place. The labia of the vulva were kept together by two sutures, and bandages were applied, but these being bitten off, the uterus soon returned to its abnormal

position. The dog was otherwise perfectly healthy, being playful and kind, and allowing handling without trouble, and her appetite was good and all the functions normal.

The second day after her admission the uterus was pushed in thoroughly and replaced in its normal position, and the vulva closed by pin sutures supported by bandages. During the day, however, one of the sutures slipped off, and the prolapsus again returned. Another closure of the vulva was followed by no better results, the organ pushing its way out, notwithstanding the external application of bandages and the use of ice introduced into the vagina.

Having failed to make any progress in the treatment, an attempt was made to keep the organ in place by pushing into the vagina, after effecting the reduction of the uterus, a child's toy balloon, which when inserted was inflated from without, but this failed with the rest.

The amputation of the organ was then decided upon. After carefully washing and cleansing it, together with the surrounding tissues, with a weak solution of bi-chloride of mercury, a strong carbolized catgut ligature was applied around the tumor represented by the everted organ, close to the base, and tied firmly, being secured by triple knots. The portion of the organ projecting back of the ligature was then amputated, and the catgut cord cut as short as possible, but left long enough to be seen and secured, if necessary, by the dilatation of the vulva.

It was found the next day that the animal had pulled out the ligature, and that a slight hemorrhage had taken place, but had stopped spontaneously. On the third day following, a small portion of tissue sloughed away. The parts were kept antiseptically clean, and on the seventh day the animal was discharged in a condition of full convalescence.

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#### A PECULIAR CASE DUE TO A FOREIGN BODY IN THE STOMACH OF A DOG.

The dog, a cocker-spaniel, was admitted to the hospital with the following history: He had been taken sick some days before, with constant vomiting, refusing to keep any-

thing on his stomach, and having been shown to a veterinarian, was treated for gastro-enteritis. Having somewhat recovered from this trouble, he was found one morning suffering with prolapsus recti, for which almost all forms of external treatment were employed, such as pads, sutures, pessaries, etc., accompanied by the internal administration of strychnia. When he was admitted, the little fellow was very uneasy, and carried with him a pessary, which was removed, proving to be made of a smooth block of wood, about three-quarters of an inch in diameter and some three inches long. The parts being carefully washed out, and antiseptics locally applied, the prolapsus having remained in its natural position, the dog was placed in a kennel and watched. On the following day the same state of things existed, the patient having strained somewhat, but sedatives soon quieted him. He drank a little milk, seemed more lively, took notice of people around him, and showed no evidence of pain. On the third day, the dog had two regular fits, after which he strained quite violently, and had another small prolapsus, which was reduced. The animal was placed and kept under opiates. He refused all kinds of food. The fourth day showed no great change; there was another slight fit, treated as before. He still refused all food. On the fifth day he was found dead in its kennel.

At the post mortem, the following lesions were found: the stomach was enlarged and congested, and contained a large ball of brown paper tightly rolled and partly pushed into the pyloric opening of the stomach. The intestines were empty, containing only some mucus and bile. The rectum was slightly congested at the places where the pessary had rested against it. Both cavities of the heart contained large clots, the balance of the organism was healthy.

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#### EPILEPTIC FITS DUE TO STOMACHAL OVER-LOADING AND INTESTINAL OBSTRUCTION.

The subject of this case was a sky terrier about six months old, which had always enjoyed good health, and was brought to the hospital on the 15th of May, with the history that he

had been in convulsions for the last twenty-four hours. The patient would occasionally get up and begin to walk, but would soon turn in a circle of short diameter for a little while, then falling down again in a fit and frothing at the mouth. No information could be obtained as to the cause of the trouble. A dose of bromide of potass. was given, but seemed to give no result, and the animal died about two hours after admission. The post mortem revealed the cause of all the trouble, in the condition of the stomach, which was enormously distended with gas and food, liquid and solid. On opening the organ, its contents were found to be several large pieces of meat, which resembled liver, and one of them larger than the other, was lodged and firmly imbedded in the pyloric opening of the stomach. All the other organs were healthy.

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#### MAL-ADDRESS.

By S. R. HOWARD, V.S., Hillsboro, Ohio.

I enclose a history of a case interesting to myself, and perhaps it may prove of interest to others:

On the 24th of May I was called to see a seven year old mare. Owner informed me that on 14th she was served by a vigorous grade stallion. On way home she laid down and appeared colicky, and straining, passed a small amount of fœces, and with it about a pint of blood. Shortly appeared better and arrived home all right.

From that time—the 14th—until I was called—the 21st—she had no passage of fœces. During all this time she remained uneasy, straining more or less constantly, small amount of bloody pus dribbling from anus, occasionally tympanic, yet strange to say, appetite had remained unimpaired. Owner did not know positively how animal had been served.

On 21st I found temperature 105° F., pulse 50, yet strong, anus and vulva tumefied, great borygmus, dull appearance and occasionally lying down. Found rupture at termination of colon, right side large enough to pass fist easily into cavity. Rectum full of bloody fœtid pus.

Advised destruction. Gave warm antiseptic injections

with opium and hyposulphite of soda internally. Removed what fœces I could reach. Could find none in abdominal or pelvic cavity. This last I consider strange.

Passing on 27th, saw them about to bury her. Just died. Had had two small passages shortly before death. At post mortem all the intestines appeared inflamed. Bladder empty and pelvic cavity jammed full of fœces. Large amount of reddish water in abdominal cavity. Rupture of termination of floating colon almost complete; a frightful looking rent. Lived sixteen days.

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## EXTRACTS FROM FOREIGN JOURNALS.

### INVAGINATED SEQUESTRUM OF THE SCAPULA IN A HORSE.

By MESSRS. BARRIER AND GERVAIS.

The subject of this report is an uncommon lesion, resulting from a kick received on the anterior border of the scapula, a short distance above the scapulo-humeral joint. The injury was not apparently of a serious character, the cutaneous wound being very small and the lameness but trifling, and nothing appearing to cause any suspicion that the matter was anything beyond a slight ordinary hurt. But notwithstanding the treatment which was suggested by the apparent condition of the case, the animal, a few days later, became very lame and the shoulder badly swollen, with a discharge from the wound of a reddish, bloody and suppurative matter, which escaped from a fistulous tract, which, on being probed, proved to extend but a very short distance down to the antea spinatus muscle. There was nothing to indicate a diseased condition of the scapula, and yet the excessive pain, the hard and warm swelling of the region, and the aspect and nature of the fistulous wound all pointed to the suggestion of a fracture of this flat bone.

The animal was consequently placed in slings, and an application of blister and mercurial ointment applied over the whole affected region, notwithstanding which he grew worse, and constitutional disturbances soon manifested themselves. He lost his appetite, and refused to rest on the slings, and in

consideration of these serious symptoms, was ultimately destroyed.

On removing the leg from the trunk, at the post mortem, numerous purulent collections were found in the axilla, the shoulder being surrounded by a large, hard, grayish colored swelling on both surfaces. All the external scapular muscles were involved in it, and had lost their coloration, becoming pale and containing numerous small purulent centres; the sub-scapularis muscle on the inside presenting the same appearance. On maceration, the scapula appeared to be surrounded by an osteo-cartilaginous muff, and constituted a true sequestrum, entirely surrounded or *invaginated* by the newly deposited bone on its outer surface.

According to the authors, the following should be the general process followed in the formation of this pathological specimen:

1st. A traumatism of medium severity, received on the anterior border of the scapula, penetrating the enveloping skin and muscles.

2d. An insignificant wound of the skin.

3d. Suppurative ostitis, consequent upon the traumatism, forming on the bone, at the injured or contused spot, with separation of the periosteum and formation of an areolar tissue of new formation.

4th. The increase and extension of the suppurative osteitis, which, instead of remaining limited, gradually enlarges and spreads until the scapula becomes isolated and surrounded with a new layer of bony tissue.

5th. The scapula becomes necrosed and forms the sequestrum, in consequence of its deprivation of the blood necessary to its nutrition.

6th. The purulent collection in the muscles and new surrounding structure was the consequent result of the excess of the inflammation, which in a reduced degree might have been followed by a comparative recovery.—*Recueil de Med. Vet.*

## A NOTE OF SUGGESTION IN RELATION TO THE DIAGNOSIS OF BOVINE TUBERCULOSIS.

BY MR. G. BOUCHET.

A cow taken with tympanitis, from which she was very sick, was relieved by puncture of the rumen, and upon inquiring into her history it was learned that she had always been in condition, and good health, though she had had a deep, thick and repeated cough, to which, however, no importance was attached. She continued healthy for a year, and had a calf, which she raised well, and had been well up to the time of the author's visit. Careful examination failed to detect any indication of the cause of the trouble. At the autopsy made at a later period, a mild abdominal tuberculosis was detected, involving more or less the entire abdominal structures. In the chest, the pleura was found normal, as also were the lungs, with the exception of a few tuberculous products through their thickness. The tuberculous process was principally located in the glands of the posterior mediastinum, all of which were diseased, some of them attaining the size of the fist, and appearing like a mass, surrounded by a capsule. They were of a yellowish appearance, with more or less thick pus in the center. One of the largest of them was situated between the lungs, just under the æsophagus, which it surrounded and more or less compressed, constituting a condition sufficient to explain the resistance to all forms of treatment so often encountered in dealing with tympanitic patients.—*Receuil de Med. Vet.*

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## PELVIC ABSCESS AS A SEQUELÆ OF DISTEMPER.

BY MR. LARDET.

In this report the author says, "When this complication takes place, which is generally when the animal is in full convalescence, he becomes suddenly dull and loses his appetite, and suffers with attacks of intermittent colic, and after a few days defecation becomes difficult and painful, the fæces being small, hard and coated. Rectal inspection then reveals a tumefied condition of the mucous membrane of that region,

which is more or less smooth, and by careful examination, fluctuation may be detected on the upper wall of the rectal sac. Puncture of the abscess gives exit to laudable suppuration, coming from an abscess of the pelvi-rectal cellular tissue. Such a case seldom ends fatally. A careful examination of the pelvic cavity is always indicated in cases of abdominal and colicky complications, in distemper or strangles, before a correct diagnosis can be made.—*Rec. de Med. Vet.*

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### ABDOMINAL TUBERCULOSIS IN A CAT.

BY MR. NOCARD.

Cases of tuberculosis in the dog or the cat are so uncommon that any new case is deserving of record. The present is the case of a seven-months-old kitten, which for two or three weeks had been losing condition, eating but little, continually lying down, and ultimately attacked with profuse diarrhœa. It was killed, and all the mesenteric glands were found to be hypertrophied, some of them softened and caseous, and the spleen gorged with small miliary tumors, hard and of a greyish color. The intestine was normal, except at the beginning of the cœcum, where the mucous membrane was thickened and ulcerated. The liver, lungs and bronchial glands were healthy. The matter of all the glands and the splenic tumors were, by Ehrlich's method, found full of the bacilli of Koch. The kitten had become infected through the medium of two patients kept in the hospital where he stayed, the patients being themselves sufferers from tuberculosis, and it is supposed that he became affected by eating the remains of the meals left by these tuberculous patients.—*Rec. de Med. Vet.*

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### WOUND OF THE CAROTID ARTERY.

BY MR. VAN AUTGARDEN.

This is a rare form of injury in veterinary records, especially in our days, when phlebotomy is so seldom practised. A horse which had just been bled at the jugular showed a tumor in the jugular groove, which filled it up and interfered

with respiration to such an extent as to give rise to roaring. When seen, the nostrils were widely dilated, the neck stretched, the eyes staring, and the roaring so loud that all the appearances seemed to indicate suffocation within a short time. All the appearances, and the history as well as the symptoms, indicated a wound of the carotid. Trachæotomy was performed immediately, in order to give relief to the difficulty of breathing, though not without trouble, arising from the large escape of blood, which flowed profusely. A large quantity of extravasated blood was washed away, and it soon became evident that the wound of the artery had been closed by a clot, and that no further interference was necessary. The animal made a rapid recovery and resumed work in about ten days. The principal interest of the case rests on the fact that the accident is quite a rare one.—*Annales de Belgique*.

#### VOMITING IN A HORSE.

BY M. VANDENABELLE.

The animal had refused his supper the day before he was seen by Mr. Vandenabelle, and his manger contained a certain quantity of food, both solid and liquid, which he had vomited at various times. He also had slight colicky pains, but no serious symptoms were exhibited. The rejected masses had a strong acid reaction. While this history and these symptoms were being observed the patient was taken with a peculiar vermicular motion of the æsophagus, easily observed in the jugular groove, and a certain motion of the head, followed by the rejection of a certain quantity of vomited substances. The pulse was small, the mucous membranes normal in color, the eyes anxious and the expression indicative of deep internal pain. Auscultation and percussion gave negative results. Deglutition of liquids was normal.

A doubtful diagnosis was made. In the treatment resort was had to anti-spasmodics in small repeated doses—camphor, valerian and opium, with mustard poultices under the chest, and small quantities of drinks to allay the thirst. No improvement was visible on the next day, and a renewal of

the sinapism and continuation of the same treatment was directed, This was followed by improvement, and recovery on the third day, when all the symptoms had subsided.—*Ibid.*

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### ŒSOPHAGOTOMY IN THE DOG.

BY PROF. F. HENDRIOK.

After two days of suffering from the presence of pieces of bone in the œsophagus, the author successfully removed them and carried his patients to a complete recovery. In both cases the presence of the foreign substances had been well established, and failing to displace them by probe or repous-sair, the operation had been performed with all the usual anti-septic measures. The mucous membrane of the œsophagus and some of the surrounding parts had undergone a certain amount of gangrenous degeneration which rendered the chances of recovery doubtful, but by a free use of phenic washes and careful attention to the diet, which was strictly liquid for several days afterwards, both patients recovered rapidly, and without any of the complications which had been anticipated when the operation was first contemplated.—*Ibid.*

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## COLLEGE COMMENCEMENTS.

### ONTARIO VETERINARY COLLEGE.

The commencement exercises of this college took place in the last week of March.

The students assembled in Richmond Hall for the closing exercises. The chair was occupied by Professor Smith, and among those with him on the platform were Sir Daniel Wilson; Hon. Charles Drury, Minister of Agriculture; Mr. J. J. Withrow, President of the Industrial Association; Dr. Thorburn, Dr. Caven, Mr. H. Wade, Mr. G. B. Smith, M.P.P., Alds. Frankland and Dodds; also the following members of the Examining Board: Mr. Sweetapple, Oshawa; Mr. Colman, Ottawa; Mr. Lloyd, Newmarket; Mr. Wilson, London; Mr. O'Neill, London; Mr. Shaw, Dayton, Ohio; and Mr. Cowan, Galt.

The principal said that the present session had been one of the most successful in the history of the college. There had been a large attendance of students from all parts of the Dominion, as also from nearly every State in the Union, and one from no less distant a country than the Sandwich Islands. Although a few failed in taking their diplomas, he hoped they would not be despondent, but stimulated to greater exertion. There had been a class of about four hundred during the session, and those from across the line, he knew, had been delighted with Toronto, and had admired its educational institutions generally. Dr. Duncan afterwards read over the list of graduates and the prize and honor list.

Hon. Charles Drury presented the medal of the Agriculture and Arts Association to the winner—Mr. A. E. Sturge, of London, England,—and alluded to the progress of Canada from an agricultural point of view, and to the immense amount of money invested in live stock, which amounted in cattle alone to about \$100,000,000, which pointed to the fact that Canada was fast becoming one of the most important cattle-raising countries in the world.

Among the other speakers were Mr. J. J. Withrow, who presented the gold medal given by the Industrial Association to Mr. F. J. Gallanough, of Thornhill, and referred to the friendly feeling which had existed throughout the term between the American and Canadian students of the college. Dr. Thorburn, Alds. Frankland and Dodds also made short addresses.

#### GRADUATES.

Adams, Herbert Turgeant.....	Clarksville, Howard County, N.W.T.
Alexander, Thomas J.....	Strathroy, Ont.
Alton, William Wellesley.....	Appleby, Ont.
Alverson, Alfred G.....	Cherry Valley, Ill.
Bowman, Robert C.....	Ilderton, Ont.
Bingham, James Edgar.....	Tyrone, Ont.
Bullivant, James.....	Tempa, Florida.
Bock, Aaron R.....	New Duudee, Ont.
Barnett, Frank E.....	West Salem, Wayne County, Ohio.
Brown, Leopold Alexander .....	Dunboyne, Ont.
Baker, Lewis R.....	Wannakee, Wis.
Bechtel, Milton T.....	Waterloo, Ont.

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Burgess, Herbert W.....	Bennington, Vt.
Boucher, William Woods.....	South March, Ont.
Butler, W. J.....	Stirling, Ont.
Brindle, D. C.....	Chambersburg, Pa.
Beattie, Francis Scott.....	Seaforth, Ont.
Blanchard, William Hutchinson.....	Pocklington, England.
Buckham, James.....	Brampton, Ont.
Blacklinton, Joseph C.....	Bate, Ohio.
Campbell, Andrew.....	
Cassels, William G.....	Paisley, Ont.
Campbell, John R.....	Milton, Ont.
Campbell, Peter M.....	Strathroy, Ont.
Church, Joseph Alexander.....	
Callander, J. C.....	Smith's Falls, Ont.
Craig, William B.....	Indianapolis, Ind.
Donaldson, Thomas Alexander.....	
Doan, Berkley Potts.....	Port Dover, Ont.
Duncan, James Edward.....	Canandaigua, N. Y.
Dunn, William H.....	Riga, N. Y.
Dorney, Albert H.....	Allentown, Pa.
Dewey, David D.....	North Manlius, N. Y.
Duncombe, Orlando Hardy.....	Waterford, Ont.
Detwiler, Charles H.....	Iron Bridge, Montgomery County, Pa.
Doswell, A.....	Toronto, Ont.
Diggs, Edward F.....	Winchester, Ind.
Eaid, Charles E.....	Jarvis, Ont.
Eisenhart, Oscar C.....	Bingen, Penn.
Fisher, George Edward.....	Goderich, Ont.
Falconer, Charles.....	Kendall, N. Y.
Franks, J. W.....	
Glendinning, C. G.....	Belfountain, Ont.
Gilchrist, William P.....	Fort Edward, N. Y.
Grieve, John.....	Seaforth, Ont.
Gordon, D. Baillie.....	Ottawa, Ont.
Gallanough, Fred. J.....	Thornhill, Ont.
Greenwood, John.....	Wellesley, Ont.
Hutton, Frederick G.....	Welland, Ont.
Hopkins, Frank M.....	Topeka, Kan.
Hodges, Alfred M.....	Nanticoke, Ont.
Holbrook, John A.....	Townshend, Vermont.
Henry, Elias Wetmore.....	Frederickton, N.B.
Harrington, John Beverley.....	Port Arthur, Ont.
Hill, Joseph G.....	Sennett, N. Y.
Hamilton, William.....	St. Mary's, Ont.
Hougendobler, J. J.....	Rohrerstown, Pa.
Higbee, William F.....	Youngstown, N. Y.
Howard, Samuel Rogers.....	Circleville, Ohio.

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Ide, Almon H.....	East Shelby, N. Y.
Jenkins, Henry H., N.W.M. Police.....	Northwest Ter.
Jameson, John W.....	Paris, Ky.
Johnston, William J.....	Minesing, Ont.
King, Thomas.....	Bluevale, Ont.
Kuhn, John Miller .....	Mercersburg, Pa.
Kurtz, Alfred.....	Neenah, Wis.
Leach, Maurice Mackenzie.....	Paris, Ont.
Lloyd, Arthur C. ....	Detroit, Mich.
Leslie, Henry Charles.....	Canton, Ont.
Mossom, Dundas H. E. McQ.....	London, Eng.
Mullin, D. V.....	Montreal, Que.
Monserrat, W. T.....	Honolulu, Sandwich Islands.
Marshall, Joseph W.....	Forest, Ont.
Manchester, John William ..	Sussex Vale, N. B.
Morrison, William McLeod.....	Birtle, Man.
Murray, Henry B.....	Port Albert, Ont.
McIntosh, Archibald J.....	Toronto, Ont.
McMurtry, D. Henry.....	South March, Ont.
McGregor, Charles F. Mortimere.....	Constance, Ont.
McQuate, Theodore C.....	Canton, Ohio.
McDonald, John.....	Petrolea, Ont.
McGahey, Robert P.....	Kemptville, Ont.
McMicken, William Bell .....	Chesterfield, Ont.
McBeath, Alonzo E.....	Bradford, Ont.
McMurty, W. Randolph.....	South March, Ont.
McCray, W. E.....	Oil City, Pa.
Nighbert, James D.....	Palmyra, Ill.
Old, William R. J.....	Goderich, Ont.
Orr, C. H.....	Cairo, Mich.
Pickering, William H.....	Forest, Ont.
Paul, Bert E.....	Wayland, Mich.
Poe, John Julius Evans.....	Harley Park, Callow, Ireland.
Purcell, Charles Wilson.....	East Boston, Mass.
Petrie, William.....	Watertown, N. Y.
Quantz, Jacob D.....	Bellantrae, Ont.
Rich, Frank Abiram.....	Avon, N. Y.
Rishel, Edward Ira.....	Vicksburg, Kalamazoo County, Mich.
Rose, D. W.....	Toronto, Ont.
Robertson, Gilbert James.....	Beatrice, Neb.
Rike, Harry W.....	Dayton, Ohio.
Spicer, Charles A.....	Pittsburgh, Pa.
Simons, Frank W.....	Marengo, Ohio.
Smith, Charles H.....	Ansonia, Conn.
Sturge, Edgar.....	Guelph, Ont.
Smith, Henry Stephen.....	Albion, Mich.
Shevalier, Eugene D.....	Cortlandt, N. Y.

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Swingley, Jacob G.....	Oregon, Ill.
Stevenson, William S.....	Tyre, N. Y.
Sutterby, Joseph.....	Batavia, N. Y.
Stutzman, Benjamin F.....	Chappel, Neb.
Storey, Jonn T.....	Goodwood, Ont.
Spensley, F. T.....	Granger, Ohio.
Saylor, David S.....	Wellington, Ont.
Sherrick, Harry R.....	
Tully, John Walter.....	Chesley, Ont.
Tanner, Byron L.....	Mount Forest, Ont.
Tanner, Vassar E.....	Mount Forest, Ont.
Thwaites, Percy.....	Toronto, Ont.
Warwick, John D.....	Wingham, Ont.
Wiley, Horace H.....	Rochester, Mich.
Williams, Fred Erwaat.....	Burdette, N. Y.
Willson, Purvis O.....	Drumbo, Ont.
Waller, Harry Noel.....	Prairie Club, Semars, Iowa.
Ward, James R .....	Alton, Ont.
Willson, John.....	Leamington, Ont.

A pleasant feature in the proceedings was the presentation of a large picture of the graduates in group form, with the recipients' photograph and those of the following professors in large size underneath: J. Thorburn, M.R.; J. T. Duncan, M.D., H.A.R.C.V.S.; J. Caven, M.D.; G. Peters, M.D.; A. H. King, V.S.; C. Richardson, M.A., to Professor Smith. The picture, which is about six feet square, with gilt bronze frame, contained the likeness of one hundred and seventy graduates. Mr. Montserrat made the presentation, hoping the recipient might long be spared to preside over the institution. Professor Smith suitably replied.

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#### CHICAGO VETERINARY COLLEGE.

The Chicago Veterinary College held its sixth annual commencement exercises in Kimball Hall on Thursday, March 21st.

The hall was crowded with a select audience. Among those on the platform were the Rev. Dr. Utter, Professors Withers, Baker, Hughes, Billings, Reading, Ellingwood, Ryan, Casewell and Periam; Dr. De Wolff, Health Department, and others.

After prayer was offered, President Withers reviewed the

progress made by the institution since its inception in 1883, when the school was started in a small down-town room with eight students attending.

This year the number of attending students was one hundred and five. The present commodious building was erected in 1886, at a cost of \$20,000, but owing to the great increase in the class it will be necessary to add two more complete stories to the structure during the coming summer. When these additions are made the Chicago Veterinary College will be one of the most substantial and complete of its kind.

The President then called the students individually before the platform and presented each with a diploma qualifying him as a doctor of veterinary science.

The following is a list of graduates :

Clarke, Lowell.....	Benton Harbor, Mich.
Cale, H. B.....	McComb, Ill.
Miner, M. L.....	St. Johnsbury, Vt.
Brougham, J. J.....	Chicago, Ill.
Rudberg, Albert.....	Denver, Col.
Daugherty, W. A.....	Avondale, Ohio.
Anderson, J. R.....	Macon, Ga.
Sayre, D. B.....	Wabash, Ind.
Thomas, L. A.....	Atlantic, Iowa.
Derwent, A. E.....	Durand, Ill.
Norton, M. T.....	Duluth, Minn.
Bown, T. A.....	Streator, Ill.
Bauer, G. L.....	Carlinville, Ill.
Richel, A. E.....	Vicksburgh, Mich.
Pierce, F. E.....	Los Angeles, Cal.
Stuart, J. T.....	Cleveland, O.
Mayne, H. D.....	Heuvelton, N. Y.
Girard, P. A.....	Benton, O.
Collins, B. J.....	Goshen, Ind.
Ramsey, S. V.....	Tuscola, Ill.
Slaght, Chas.....	Mason, Mich.
Risum, T. G.....	Bangor, Dak.
De Wolff, F. L.....	Sycamore, Ill.
Tilton, E. W.....	Oxford, Kan.
Smalley, L. F.....	Loudonville, O.
Roberts, C. A.....	Chicago, Ill.
Campbell, H. S.....	Edison, O.
Collins, A. H.....	Norwich, Ont.
Mayo, N. S.....	Ingham, Mich.

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Lawton, E. W.....	Sheffield, Ill.
Huenink, C. J.....	Cedar Grove, Wis.
Klutz, L. M.....	Gold Hill, N. C.
Reed, J. W.....	Peru, Ind.
Pope, G. W.....	Lee, Mass.
Tyler, Allie.....	Hampshire, Ill.
Thomas, D. C.....	Osage, Iowa.
Wright, J. M.....	Wenona, Ill.
Myers, W. F.....	Fort Wayne, Ind.
Stark, J. M.....	Kingston, Ill.
Howard, T. B.....	Montpelier, Ind.
Hall, E. T.....	Bloomington, Ills.
Hall, H. N.....	Ayr, Nebraska.
Keller, W. F.....	Hastings, Nebraska.
Roberts, David.....	Franksville, Wis.
Smith, W. A.....	Sparland, Ills.
Morton, W. P.....	New Richmond, Wis.
Freeman, W. P.....	Stafford, Neb.

Rev. Dr. Utter distributed the prizes. Dr. John Anderson was awarded the prize in Materia Medica and Obstetrics; the prize in Pathology to Dr. E. W. Lawton, and in Anatomy to Dr. James Wright.

Numerous handsome bouquets, gifts from admirers, were also distributed among the students.

The class prophet, Dr. N. S. Mayo, then read an exceedingly clever rhyming production of his own composition which elicited great applause, and caused considerable merriment among the audience and his classmates.

Dr. D. C. Thomas delivered an able valedictory address, in the course of which on behalf of his class he bade a feeling farewell to his teachers, stating that the class of 1888-9 were dispersing to sixteen different States, and in all probability would never meet together again.

Health Commissioner De Wolff addressed the graduates, giving them some practical advice, and his genial words will be long remembered by the newly qualified men.

The Doctorate address by Professor F. S. Billings brought the exercises to a close.

The proceedings were enlivened at intervals with music by Lyons' orchestra and the Imperial Quartette.

## OBITUARY.

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CHARLES S. MOULTON, M.D., D.V.S.

We regret to announce the death of our colleague, which took place in the month of May, from heart disease, with which the doctor suffered for several years. He graduated at the American Veterinary College in 1882, and a few years after as M. D. from the Medical Department of the University of Michigan. Dr. Moulton carried on a lucrative practice in Washington and throughout the United States, where he had made a large number of friends. The following resolutions were passed by the Maryland State Veterinary Medical Association, of which he was a worthy and well appreciated member.

WHEREAS, It has pleased Almighty God, in His wisdom, to remove from our midst our friend and professional brother, Chas. S. Moulton, M.D., D.V.S., of Washington, D. C., who was one of the founders of this society, and who had ever taken an active interest in all that concerns the welfare of the veterinary profession.

*Resolved*, That we, the Maryland State Veterinary Society, deeply deplore his loss to the veterinary profession and especially to this society, and that we extend our heartfelt sympathy to his family in their bereavment.

*Resolved*, That these resolutions be spread upon the minutes of this society, and published in the AMERICAN VETERINARY REVIEW, the *Journal of Comparative Medicine and Surgery*, and the *Baltimore Sun*.

*Resolved*, That a copy of these resolutions be sent to the family of the deceased.

A. W. CLEMENT,  
WM. DOUGHERTY,  
C. K. DYER,

*Committee.*

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CORRESPONDENCE.

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## VETERINARIAN WANTED.

COLUMBUS, Ga., April 29, 1889.

*Editor Review :*

I address you as an Eastern man from Massachusetts, who came here to spend the winter, and am well pleased with the climate and people.

I am a lover of good stock, and like to see the dumb animals well cared for when in need of medical attention, but am sorry to say of a place of 30,000 people, with six or eight livery stables, four dray lines, to say nothing of horses and other stock kept for private use, there is not a first-class veterinary surgeon within one hundred miles of this place. I have seen more horses and mules die here this winter than I ever saw in all my life in Massachusetts, and solely for the want of a first-class veterinary surgeon. The enclosed clip will give you some idea of the place and the amount of business done here.

Now if you know of a good veterinarian, one that is competent to fill such a want as this place requires, steady and reliable, you can secure for such a person a fine location by writing to Messrs. Jordan, of Empire Stables, who will do all in their power to aid such a person. The Messrs. Jordan are live men and of first-class character and reliable in whatever they say or do. As to their financial standing consult Bradstreet or other commercial reports. Unless you could put a good man upon this location, please do not put any.

Yours respectfully,

M. CRAVEN,

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## ANOTHER.

MOUNT HOLLY, N. J., April 3, 1889.

*Editor Review :*

DEAR SIR.—Do you know of any young veterinarian of ability? He should be a man both of ability and good char-

acter. If you know of any such person he will find that it will be very much to his advantage to locate here. If you will put us on the track of such a person, we can give him more points, and by so doing you will do us a great favor.

Yours respectfully,

PRICKITT & BARRINGTON.

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ANOTHER.

ALEXANDRIA, MINN., May 30, 1889.

*Dr. A. Liantard.*

DEAR SIR.—Do you know of a good veterinarian that wants to locate and practice? I made the same inquiry of Dr. Valerius, and he referred me to you. Alexandria is a good place for a good man and we would help him all we could, but we don't want any quacks, for we have plenty of such now.

THOMPSON & COWEN.

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STILL ANOTHER.

LEOMINSTER, MASS.

DEAR SIR.—There is a golden opportunity for a first-class veterinary surgeon in this town. We have six livery stables, six or eight jobbers and a number of nice driving horses, with a good driving park. This is one of the finest towns in the State. We have eight thousand inhabitants and are only five miles from the city of Fitchburg. A good veterinarian would soon secure a good practice if a first-class and a *sober* man.

HORSEMAN.

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Now that the rush of the summer work is somewhat over, we desire to call attention to some matters looking forward to profitable work for the fall months, and through the winter. Write to B. F. Johnson & Co., 1009 Main St., Richmond, Va., and they will show you how to do a grand work, which can be made a *permanent thing*.

# AMERICAN VETERINARY REVIEW,

AUGUST, 1889.

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## EDITORIAL.

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ÆTIOLOGY OF TUBERCULOSIS.—The conclusion of this most excellent article—Its translation due to the initiative of the Massachusetts State Veterinary Association—Dr. Koch's letter of authorization—The enterprising spirit of the REVIEW—Expense no obstacle to its publication—Yet it is not so complete as might be wished—Enough shown to demonstrate that the bacillus is the all-important factor—without it no tuberculosis—with it nothing else—The value of the paper to all, pathologists, biologists, students—Minute points of detection described—The pseudo-tubercles cannot deceive any longer. VETERINARY APPOINTMENT.—Progress made in the past few years—Position of the veterinarian to-day—That of a few years ago—official appointments—Creation of new veterinary positions—Sanitary science makes it all—Dr. Knowles' recent appointment—His prospects—Our hopes—Need for an official veterinary directory—We are ready for it. IMPORTANT NOTICE.—If the REVIEW does not come regularly, we are not always to blame—Help us in the proper delivery. UNITED STATES VETERINARY MEDICAL ASSOCIATION—IOWA STATE VETERINARY MEDICAL ASSOCIATION—Annual meeting of both.

ÆTIOLOGY OF TUBERCULOSIS.—The portion of the article of Professor Koch on the "Ætiology of Tuberculosis" which we print in the present number of the REVIEW, forms the conclusion of this able and interesting treatise. For the translation of this paper our acknowledgments are due to the Massachusetts State Veterinary Medical Association, to whose kindness must thus be attributed the opportunity of the English reading public to profit by a study of the ablest dissertation yet written on the subject in question. We improve this opportunity to renew our thanks to the Massachusetts Association, and we must also express our appreciation of the kindness which characterizes the reply of Professor Koch to our solicitation for leave to make use of the translation, as

shown in his letter to that effect, which has been placed in the archives of the Association, and which in the original reads as follows :

(Copy.)

BERLIN, KLOSTER STR. 36.

DER 29 APRIL, 1889.

Hochgeehrter Herr !

Auf die in Ihrem Schreiben vom 31 März an mich gerichtete Anfrage, erlaube ich mir Ihnen mitzutheilen, dass ich mich damit einverstanden erkläre, dass die Übersetzung meiner Arbeit über die Ätiologie der Tuberculose durch den Druck veröffentlicht wird.

Mit grosster Hochachtung, ergebenst

R. KOCH.

(Translation.)

36 KLOSTER ST., BERLIN,

APRIL, 29, 1889.

DEAR SIR.

In reply to the request contained in your letter of the 31st of March, I beg leave to say that you have my full authorization for the publication of the translation of my work upon the *Ætiology of Tuberculosis*.

With highest consideration, yours

R. KOCH.

We trust that our readers will not fail to appreciate the zeal which has prompted us in presenting the great work of Professor Koch to the veterinarians of America. The enterprise has not been accomplished without incurring a serious pecuniary outlay, but this consideration has not deterred the REVIEW from taking a step which seemed to be necessary to the fulfilment of the duty, to which we have devoted our time and ability, of laboring for the advancement and elevation of the cause of veterinary instruction in the United States. But, though accomplishing thus much, we have, greatly to our regret, been unable to do to the paper the full justice to which it is entitled. The original is illustrated with many fine plates of which we have been unable to obtain the use, and many references have been, for that reason, necessarily omitted. But, notwithstanding its incompleteness in this respect, the amount of matter we have put in print will more than suffice to prove its value, and to assist other investigators in any researches they may be disposed to undertake.

That the bacillus of Koch is the cause of tubercular disease ; that to these are due all the different lesions of the various tissues in which it is found implanted ; and that it is then in-

variably present, though, perhaps at times, difficult to discover, to color, or to isolate; and that, unless it is *there*, tuberculosis DOES NOT EXIST—all this is proved beyond question or doubt in Koch's "Ætiology." The modes of development, the processes of the biological studies which are required for the investigation; everything discoverable, in fact, connected with this bacillus, are minutely, carefully, and thoroughly described and presented by the author to the inquiring student. With this work properly appreciated and well studied, there is no longer any reason for error of diagnosis in that fatal affection. The lesions are in many instances so characteristic that any error can scarcely be possible, and yet how frequently may it happen that lesions, of the lungs, for instance, often peculiar, may be of a tuberculous aspect and yet entirely different in their nature! The pseudo-tubercles of the lungs, sometimes encountered, have no doubt in some instances led to a diagnosis of alleged phthisis, which would have been of an entirely different nature had the teachings of the author been followed, and the truth discerned, which the absence of the bacilli would have made certain, if it had but been rightly interpreted.

"Ætiology of tuberculosis," which has filled so important a place among German scientific authorities, may now perform the same good office for English-speaking veterinarians, and by such of us as may unfortunately have much to do with this disease in the United States, we hope it will be recognized as an instructor and assistant beyond any possibility of rivalry or cavil, or chance of supercedure.

VETERINARY APPOINTMENT.—The progress accomplished by veterinary medicine in public estimation, and the importance and value of the services which it is now conceded may be rendered by veterinarians in their legitimate sphere—looking over a retrospect of no more than five short years—may be justly viewed with surprise and satisfaction. Within a period a little longer than that no one would have imagined, outside of a dream, the important official positions which veterinarians are now called upon to fill. We well remember the ridicule and derision encountered by an amateur and

lover of veterinary science who, at the creation of a board of health in one of the large cities of the East, suggested the wisdom and advantage of including veterinarians among the number of its appointees. Yet to-day, every board of health, whether of city or of State, which can claim a right to be considered a complete and practicable organization, has its veterinary officers and inspectors, who are indeed their most efficient and influential members and upon whom usually fall the burdens of labor and responsibility, when epidemics occur, or other occasions arise which test the value and demand the interposition, while they illustrate the necessity of the existence, of these extra creations of sanitary precaution.

These remarks are partly *apropos* of the new appointment by the State of Indiana of which we have just heard, of a comparatively recent graduate, Dr. M. E. Knowles, who has been commissioned as State Veterinarian for that commonwealth. Our knowledge of Dr. Knowles authorizes the expression of our confidence in his character and his ability as a young, energetic and competent veterinarian, who will render good service to the State which has honored him. There ought to be published somewhere an authenticated and properly managed directory containing the names of all the State, Territorial and other official veterinarians in the land, and we improve the occasion to request such of our brethren as are occupying such positions, to furnish the REVIEW with their names and addresses for classification and preservation. Reference, professional comity and mutual communication for purposes of common interest and convenience may be greatly facilitated by such a measure. Who will second the motion?

IMPORTANT NOTICE.—We have frequently received complaints of the failure of the REVIEW to reach the proper parties. This would imply on our part a carelessness unworthy of our patronage and a loose manner of doing business that we desire to defend ourselves from. We have, however, made inquiries into the causes of the non-delivery, and in the great majority of cases, have found the following reasons: either an imperfect address; and at times a wrong address; or

no address at all—neither of which errors can be laid at our door. It may be the case of a practitioner who had merely given us his name, town and State, without the county; or one who has moved away and left no directions to the old post-office and certainly none to us; or, and that is *common*, a student who has subscribed while at college and at the time of leaving and returning home has not given us his new address. This we find has been quite commonly the case with many of the students of all the colleges, whether in the United States or in Canada. We can assure our patrons that we are anxious to have them receive their *REVIEWS* in time, but they certainly ought to help us in so doing. Kindly see that the address on your next *REVIEW* is correct, and if not, let us have it as it should be.

UNITED STATES VETERINARY MEDICAL ASSOCIATION.—We are asked by Dr. W. Hoskins, Secretary of the above named Association, to announce that the next annual meeting of that body will take place on the 17th of September in the city of Brooklyn. Due notice of the same will be given to all members by the Secretary.

IOWA STATE VETERINARY MEDICAL ASSOCIATION.—We are in receipt of a notice of the second annual meeting of this Association, which is to be held in the parlors of the New Savery House at Des Moines, Iowa. We take this opportunity to thank President S. Stewart and Secretary T. Butler for their kind invitation, and with our best wishes for their Association express our regrets at our inability to be present because of our absence from the country.

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## ORIGINAL ARTICLES.

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### ÆTIOLOGY OF TUBERCULOSIS.

By DR. R. KOOH, Privy Councillor.

(Translated by Rev. F. SAURE.)

(*Transactions of the Massachusetts Veterinary Medical Association.*)

(Continued from page 171.)

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Twentieth experiment: Of five cats the first received an injection of pure blood serum, died; second the same serum with an addition of reincultur No. 23

(miliary tubercles of man, cultivated for five months in eight successive breedings;) the third from reincultur No. 1 (lung phthisis of man, cultivated for seven months in twelve successive breeds); the fourth from reincultur No. 16 (perlsucht knot, cultivated for five and a half months in nine successive breedings); the fifth from reincultur No. 13 (tuberculosis of monkey cultivated for three months in five successive breedings). Just the same was done with five guinea pigs. Of the last, one each died on the twelfth, fourteenth, fifteenth and twenty-first days. The controlthier was killed on the twenty-second day. Of the cats the fourth died on the twenty-second day, the third on the twenty-seventh day, the other animals were killed on the twenty-eighth day. All the animals into which the bacilli liquid had been injected showed the familiar tuberculous changes in a state of development corresponding with the space of time since the injection. As well the cat as the guinea pig into whose abdominal cavities pure blood serum had been injected, were wholly free of tuberculosis. This experiment, like several previous ones, was undertaken to test any possible differences which might exist in the results of bacilli culture originating in the various forms of tuberculosis. But this time also the expectation cherished was not fulfilled; for the tuberculosis generated by the various reinculture conducted itself exactly the same in all, in the cats as well as in the guinea pigs.

Twenty-first experiment: Reincultur from tuberculosis of monkey (No. 11, cultivated for five months in ten successive breedings) was injected into the abdominal cavity of five rats. These animals were fed for some time beforehand with the dead bodies of tuberculous guinea pigs. In the case of other rats which belonged to the same feeding experiment and had been killed, only individual grey knots had been found a few times. But when the rats, into whose abdominal cavity tuberculous bacilli had been injected, were killed, after five weeks, numberless tuberculous knots were found in the lungs, in the greatly enlarged spleen, and in the liver and omentum.

Twenty-second experiment: Reincultur (No. 24, from a phthisic lung, cultivated for five months in nine successive breedings), rubbed up in distilled water, was injected into the abdominal cavity of the following animals; six guinea pigs, three cats, four white mice, four domestic fowls, eight doves. The guinea pigs died in from ten to seventeen days, the cats one each on the fifteenth, twenty-third and twenty-fourth days. The results as found in the dissection were the same as in the other experiments. The mice, fowls and doves, to be sure, remained alive, but were rough, thin, and seemed sick. As they did not recover, they were all killed at the end of ten weeks. The mice showed the same appearance as the white rats; they had quite numerous tuberculous knots in the lungs and very many in the greatly enlarged spleen. In the fowls and doves were found such knots as have already been described in the intestines and in the liver.

#### INJECTION OF REINCULTUREN IN THE VEINS.

By this method the infection of the animal is wrought most quickly and in the manner most productive of result. The body is at once overflowed by means of the blood with as great a quantity of the infectious matter as one wishes. Said matter has no need to overcome the hindrances put in its way, by the lymph-

glands, etc., as when other methods are used, but spreads itself immediately over all the organs and causes a great and quite uniformly distributed tuberculous eruption. The mode of infection has plainly the greatest resemblance to that of miliary tuberculosis in man, where the tuberculous virus also makes its way into the blood and so is carried everywhere. By the help of injection into the veins tuberculous knots can be called forth in all the organs in such short time, and in so enormous numbers as is never the case in spontaneous tuberculosis; a mistaking of one for the other is therefore here completely excluded. The liquid in which the reinculture of tuberculous bacilli were divided as finely as possible was filtered through fine gauze, in order to keep back all coarser particles, and then injected with one of the formerly described disinfected syringes, into the vena jugularis, or according to Aufrecht's example, direct into the ear-vein of a rabbit which had been laid bare.

Twenty-third experiment: Of twelve rabbits, two had a half cubic centimeter of pure blood serum injected into the ear-vein; four rabbits received in the same manner blood serum with an addition of reincultur No. 11 (tuberculosis of monkey, cultivated for six months in eleven successive breedings—compare the seventeenth experiment); three rabbits blood serum with reincultur No. 1 (from phthisic lung cultivated for six months in ten successive breedings); three rabbits, blood serum with reincultur No. 19 (perlsucht lung, cultivated four months in seven successive breedings). In the first days after the operation nothing striking was to be noticed in any of these rabbits. The two first remained brisk and vigorous, all the others began to breathe hard in the second week, and became emaciated with unusual rapidity. The first rabbit (injection with cultur No. 1) died after eighteen days; the second and third (injection with cultur No. 11) after nineteen days; the fourth (cultur No. 19) after twenty-one days; the fifth (cultur No. 1) after twenty-five days; the sixth and seventh (cultur No. 11) after twenty-six and twenty-seven days; two other animals on the thirtieth and thirty-first days. The last and the two controlthiere were killed on the thirty-eighth day after the injection. In the conduct of the lungs and other organs of the animals treated with the various culture, as in former similar experiments, no distinction could be observed. In all the animals numberless miliary tubercles were found in the lungs. The liver and spleen of all these animals contained an extraordinary number of tubercles. In those which died first the knots were smallest, but also most numerous. It was plain that the great number of tubercles had caused such an early death. In the animals dying later the number of knots was somewhat smaller, but their size, on the contrary, decidedly larger. The two controlthiere were found on dissection without a deposit of tubercles in any organ.

Twenty-fourth experiment: Pure culture of lupus, No. 35 (cultivated for five months in eight successive breedings), rubbed up with distilled water and injected into the ear-veins of five rabbits. These died from the thirteenth to the eighteenth day after the injection and in the dissection showed the same state of things as in the rabbits of the former experiment.

Twenty-fifth experiment: Pure culture of monkey tuberculosis No. 11 (cultivated for six months in twelve successive breedings), rubbed up with distilled water, was injected into the vena jugularis of ten rabbits which were intended for experiments in inhalation with means of hindering the development. They

all died in the course of two to three weeks after the injection and had great quantities of tubercles in lungs, liver and spleen.

The tuberculous knots generated by injection into the course of the blood, like all the other infections brought about by pure cultures, were not to be distinguished from the tubercles arising spontaneously. They contained tuberculous bacilli in greater or lesser numbers and were virulent, for, when inoculated into other animals, as was frequently done, they caused tuberculosis in the same manner as the inoculations with genuine, spontaneous tuberculosis.

#### INHALATION OF PURE CULTURES OF TUBERCULOUS BACILLI.

In order to bring tuberculous substances into the lungs of animals to be experimented on, either from a tracheotomic wound an injection was made into the bronchiæ, or the infectious mass suspended in a liquid was made into spray and breathed in by the animals. The first method does not sufficiently correspond with the natural mode of infection, and is complicated in a disturbing manner by the wound necessary for the operation. On that account I have chosen the second method, which to be sure, for evident reasons, is not without danger to the experimenter, and hence demands especial precautions.

The experiment was carried out in the following way: a very roomy box with an opening on one side for the mouth of the atomizing apparatus, was placed in a garden at a sufficient distance from inhabited rooms. The atomizing apparatus was put on the outside of the box and projected with its mouth into the interior of the box. By means of a rubber and a suitably long lead pipe which was put through the wooden framework of a closed window, the apparatus was connected with the rubber bellows, and could so be set in motion from the room without the necessity of the experimenter's venturing within reach of the atomized liquid.

Twenty-sixth experiment: Pure culture from a human phthisic lung (No. 1) cultivated fifteen months in twenty-three successive breedings was rubbed up with distilled water and the liquid so thinned that it appeared almost clear. What visible crumbs were still present in the liquid were deposited after a short rest, and the upper layers of the liquid, showing scarcely any cloudiness, were poured off and used for inhalation. On three successive days, each time in the course of half an hour 50 cctm. were atomized and inhaled by the following animals in the box: eight rabbits, ten guinea pigs, four rats, four mice. After the inhalation the animals were kept in separate cages, and well taken care of. In some animals, in ten days difficulty of breathing showed itself; then three rabbits and four guinea pigs died in from fourteen to twenty-five days. All the other animals were killed twenty-eight days after the last inhalation. All the rabbits and guinea pigs had numerous tubercles in the lungs, varying in size according to the length of time the animal had lived after the inhalation. In the animals dying latest, in those killed there were already tubercles in the liver and spleen. The tubercles in the lungs were in every respect exactly like those which were obtained in guinea pigs and rabbits through inhalation of phthisic sputum in experiments undertaken for other purposes. Especially the tuberculous knots generated by inhalation of phthisic sputum and those generated by the inhalation of pure cultures had that in common, that when they had reached a certain size

their alveolar spreading could already be plainly recognized by the naked eye. They did not appear sharply rounded off and circumscribed, but embraced mostly the centre of a lobulus. As the single alveoli were filled with a caseous mass and hence appeared as fine whitish little points, they had a dull fine-grained appearance, and on their border the white-yellowish little points of the caseous alveoli showed themselves very plainly against the dark, greyish-red circle. The largest tuberculous knots embraced an entire lobulus and sometimes ran together into neighboring knots, in this manner forming larger, thickened, white-yellowish places in the lung which repeated completely the appearance of caseous pneumonia. The spontaneous tuberculosis occurring in rabbits and guinea pigs also shows in the structure of the primary tuberculous knots the conduct just described, namely, the alveolar spreading of the tuberculous process. This circumstance, therefore, confirms the view already expressed, that the spontaneous tuberculosis of these animals is almost exclusively an inhalation tuberculosis.

The rats and mice which were killed had very numerous little grey knots to the size of a hemp seed in the lungs, many of which possessed a white-yellowish centre, yet the caseous degeneration was by far not so advanced as in the lungs of the guinea pigs and rabbits. In the spleen of the rats and mice also, only single grey knots were found. These animals, as has already been often made prominent, are far less sensitive to tuberculosis, the single tubercles develop in them much more slowly, and the further spread of the tuberculosis to other organs does not occur so easily.

Also microscopically the tubercles arising from inhalation of pure cultures resemble completely the genuine tubercles in the arrangement of the epithelioid cells, the giant cells, and the contents in tuberculous bacilli. In order to prove the infectious properties of the same, twenty-two guinea pigs were inoculated subcutaneously in the abdomen with tubercles from various organs, as well from several guinea pigs as from rabbits and from the lung of a rat and of a mouse. These without exception were very soon attacked by swelling of the inguinal glands on the side of the inoculation, became emaciated and died in course of five to eight weeks of tuberculosis.

If we look over all the experiments with pure cultures we reach the following results :

Those animals which belong to species easily susceptible to tuberculosis, namely, guinea pigs, rabbits, field-mice and cats, became tuberculous without exception in consequence of the infection with tuberculous bacilli. The number of these animals amounts to two hundred and seventeen (ninety-four guinea pigs, seventy rabbits, nine cats and forty-four field mice). A number of animals for counter experiments, treated in like manner with indifferent liquids, and kept under the same conditions, on the contrary, without exception, remained free from tuberculosis. Of the less susceptible animals, as a result of a simple subcutaneous inoculation, only domestic fowls, and, moreover, only half of those inoculated, became tuberculous. But even dogs, rats and white mice, which are usually very slightly susceptible to tuberculosis, could not withstand the infection with large quantities of purely cultivated tuberculous bacilli, and also without exception, became tuberculous.

The various methods of infection used had the same effect with the pure

cultures as with the natural tuberculous substances, only the first had a somewhat quicker effect than the last.

The products of the infection also were exactly like those obtained with the natural infectious material, as well in their microscopic structure as in their contents of tuberculous bacilli and in their virulent properties.

By the most careful attention to all the prudential measures needful for the avoidance of mistakes in experimenting with tuberculosis, errors are with certainty excluded from these experiments. With reference to this it may also be made prominent here that in the same manner as with tuberculous bacilli, an extraordinary number of experiments with other disease-producing and non-disease-producing bacteria were made. These were also put into the anterior eye-chamber of rabbits, or were injected into their veins, they were subcutaneously inoculated into rabbits, guinea pigs, mice, etc., and injected into the abdominal cavity. Other bacteria were also used for experiments in inhalation according to the method already described. But tuberculosis was never generated in these animals by these means.

In these experiments made with pure cultures, also only the tuberculous bacilli completely freed from all original products of the disease, can have been the cause of the tuberculosis. The proof of the proposition that tuberculosis is an infectious disease conditioned upon tuberculous bacilli, is herewith concluded. One could be sure to say, and it has been said, that the tuberculous bacilli are one cause for the occurrence of tuberculosis, but that besides these other things, for example other micro-parasites, can likewise generate tuberculosis. This supposition is, nevertheless, erroneous, because as we have seen, in all cases of genuine tuberculosis, tuberculous bacilli occur, and the manner of their occurrence allows us to infer a causative connection with the disease. If in spite of this one would claim that besides the tuberculous bacilli still another special tuberculous virus exist, that would justify a claim that beside trichinae and itch-mites still another specific, until now unknown agent must exist as infectious material. We can, therefore, with right say that the tuberculous bacilli are not only one cause, but the only cause of tuberculosis, and that without tuberculous bacilli there is no tuberculosis.

Therewith, tuberculosis is joined to inflammation of the spleen in knowledge of its ætiology. The tuberculous bacilli stand in just the same relation to tuberculosis as the inflammation of the spleen bacilli to that disease.

## G—THE RELATIONS OF THE TUBERCULOUS BACILLI TO THE ÆTIOLOGY OF TUBERCULOSIS.

The investigations communicated in the preceding have already gained us so much knowledge of the biologic properties of the tuberculous bacilli, and their peculiar behavior in the body attacked by them, that by their help the ætiology of tuberculosis in its outlines may be stated with certainty. In time we shall certainly become more thoroughly acquainted with the properties of tuberculous bacilli, and find out much that is new about them, which will extend our views of the ætiology of tuberculosis, and in many ways amend them; nevertheless, this conviction cannot prevent us from forming

an opinion now as to the relations of tuberculous bacilli to the disease caused by them.

If we start from the experimentally proved proposition that only tuberculous bacilli have the power of generating genuine tuberculosis, and if we apply ourselves to following the way which the bacilli take in the infection, the question of the origin of the bacilli first forces itself upon us. Do they occur anywhere, and independent of the human or animal organism, in the outer world, as for example must be concluded of the inflammation of the spleen bacilli and the micrococci of erysipelas? The answer to this question is of the greatest importance, not only for the ætiology, but also much more for the prophylaxis. For, granted the tuberculous bacilli live in the decaying animal or vegetable materials everywhere to be found, that they can increase and form spores, then it would hardly be possible to keep these parasites away from man. But fortunately it is otherwise. Experience has taught that the tuberculous bacilli grow much more slowly than all other bacteria; further, that they only grow in blood serum and meat liquid, and, which is the main point, they need temperatures of more than  $30^{\circ}$  C. in order to thrive. Also, when all these conditions were found united, but the tuberculous bacilli were not protected against the luxuriant growth of other quickly growing bacteria, then, as one can often enough see in the cultures corrupted by foreign bacteria, the bacilli would be crowded out and killed by the rival bacteria. Now, indeed, the conditions of development favorable for tuberculous bacilli, especially the warmth of  $30^{\circ}$  C. day and night for weeks are found united nowhere except in the animal organism, and there is, therefore, no other supposition possible than that they are dependent for their existence wholly upon the animal and human organisms. They are therefore, genuine parasites, which cannot exist without a body to support them. They are not like the anthrax-bacilli, accidental parasites, which usually complete their course of development in the outer world and only occasionally make an invasion into the animal body. There exists also an essential difference between the anthrax-bacilli and the tuberculous bacilli, in that the first only multiply in the animal body, but never form spores, and for the development into the permanent form must get into the outer world again, while the tuberculous bacilli complete their entire course of development in the body and in no way need a life in the outer world in order to take the form necessary for the preservation of the species.

Another question is, whether from the wide-spread bacteria, which often get into the body, under favorable conditions, by means of adaptation and successive breedings, tuberculous bacilli might not arise, or on the other hand the tuberculous bacilli either in the body or after they had left the same might not change into harmless bacteria. It would then not need the invasion of specific bacteria to develop tuberculosis, but all would depend on the necessary preparatory conditions for changing harmless into harmful bacteria, which would be all the same as one usually calls tendency. The representation of a cross-breeding of tuberculous bacilli corresponds exactly with the now often held but widely exaggerated views of the changeable nature of bacteria, and has already found supporters. More value than that of a

purely hypothetical view it can, nevertheless, not claim, for no facts speak for it, but many against it. A certainly proved example of a breeding of harmful bacteria from harmless ones, as is well known, does not yet exist, and there is, therefore, no ground for ascribing to tuberculous bacilli origination of that sort from indifferent bacteria. There is so much the less reason for this, since among the numberless experiments in animals with disease-producing and non-disease-producing bacteria, it has never occurred that in the so very favorable breeding ground of the bodies of rabbits and guinea pigs, tuberculous bacilli have developed from other bacteria. On the contrary, all experiments undertaken with the necessary precautionary measures teach that tuberculosis only arises when genuine, that is to say, complete tuberculous bacilli are united with the animal body.

The relations are different in regard to an eventual weakening of the tuberculous bacilli, since the weakening of the anthrax-bacilli can be cited for the possibility of such a proceeding. Although the possibility of such a change in the virulence is not to be disputed, nevertheless it must be considered that the weakening of the anthrax-bacilli is completed under circumstances which can only be brought about artificially, but which do not come into play in ordinary circumstances either in the body or out of it. Moreover, against such a supposition the fact speaks, that tuberculous bacilli do not show the slightest change in their qualities, especially in their virulence, when successive breedings have been carried on in cultures, that is to say out of the animal body, and on a dead breeding substratum almost two years. Also in the experiments of Fischer and Schill, which are reported in another part of this paper, when tuberculous bacilli had been exposed for six weeks to the influence of decay, no weakening of the virulence occurred. All this speaks with decision against the supposition of an easily occurring change in the virulent properties of the tuberculous bacilli. It is, perhaps, inconceivable that the bacilli did not at some time proceed from other bacteria. But after they had once become genuine parasites, they appeared to have the peculiarity common to other parasites of holding to their qualities with great obstinacy.

The only source for the origin remains, therefore, the animal or human organism, and opportunity is not lacking to these parasites, owing to the extraordinary diffusion of tuberculosis, to reproduce themselves in this field in enormous masses, to develop the permanent form, to get into the outer world, and to attack other victims.

Among the various forms of tuberculosis there are, to be sure, only certain ones which admit an easy transference of the bacilli. But these are exactly the most frequently occurring forms, namely, phthisis and the tuberculous diseases of the domestic animals. The other sorts of tuberculosis play almost no part in reference to infection, partly because they remain so hidden that they can only exceptionally cause infection.

If we ask first in how far phthisis can cause a transference of tuberculous bacilli from diseased to healthy people, it is quite evident that here all the conditions for the spread of the infectious material are present in fullest measure. One only needs to remind himself that on the average one-seventh

of all men die of phthisis, and that most phthisic patients, at least for some weeks, often for months, throw out great quantities of sputum in which enormous quantities of spore-bearing tuberculous bacilli are contained. Of these numberless infectious germs, which are spread everywhere on the ground, on articles of clothing, etc., much the greater part perish again, without ever finding opportunity to establish themselves anew in a living organism. If one farther considers, that according to the experiments of Fischer and Schill, already mentioned, the tuberculous bacilli can retain their virulence in a decaying sputum for forty-three days, and in dry air sputum for one hundred and eighty-six days, then with regard to the great number of tuberculous bacilli produced by the phthisically diseased, and to the endurance of the bacilli in a damp as well as dry condition, it is easy to see and explain the enormous diffusion of the tuberculous virus.

As to the method in which tuberculous virus is transmitted from the diseased to the healthy no doubt can obtain. In consequence of shocks from coughing of the diseased person, little particles are rent from the tough sputum, sent into the air and so dispersed like dust. Now numerous experiments have taught that the inhalation of finely dispersed phthisic sputum not only makes those sorts of animals sensitive to tuberculosis, but also those capable of resistance tuberculous with absolute certainty. That man should be an exception to this is not to be supposed. It may, therefore, be taken for granted that when a healthy human being accidentally finds himself in the immediate neighborhood of the phthisically diseased, and inhales particles of sputum sent forth into the air, he can be infected by them. But infection taking place in this manner will probably not occur very often, because the bits of sputum are usually not so small that they can long remain suspended in the air. Far more adapted for infection is, on the contrary, the dried sputum, which, owing to the careless way in which the sputum of consumptives is treated, can plainly get into the air in considerable quantities. Not only is the sputum spit directly upon the ground, there dried and trodden under foot and stirred up in the form of dust, but it often becomes dried and made into dust from the bed clothes, articles of clothing and especially from handkerchiefs, which are soiled even by the most cleanly patients by wiping the mouth after expectorating the dangerous infectious material. The experiences which have been gained from the investigation of the air, with reference to bacteria capable of development, have taught that the bacteria are not suspended in the air in an isolated condition, but that they, with the liquids in which they have grown, dry on the surface of objects and only get into the air when the dried up mass breaks off in little bits, or when the bearers of the dry bacteria liquid themselves are so light that they can be carried away by the lightest breath of air. As such easily moved bearers, little bits of dust act best, which consist of fragments of plant fibres, animal hair, epidermis scales and similar materials. On that account defilement from vegetable tissues and animal hairs and bed clothes, clothing and handkerchiefs, when caused by phthisic sputum are most to be feared. From spittoons and from the floor dried sputum can only be separated in larger particles, which are not easily raised up into the air; on the contrary, one can scarcely conceive a more fav-

orable arrangement for the dispersion of the sputum particles than the rapid drying on cloth, from which with every motion little threads separate themselves, which carry the infectious material into the air, remain suspended comparatively long, and when they finally sink to the ground are whirled up again by the lightest breath of air. The investigations of the air carried on by Hesse are specially instructive on this subject.

As has already been mentioned, the virulence of the dried sputum can be preserved for months; under some circumstances perhaps longer. The last qualities of the virulence depend probably upon its containing well developed spores capable of developing germs. In any case, even if the dried sputum retains its virulence only a few weeks, a consumptive in the condition in which one generally finds these sick persons is very well adapted to provide his immediate surroundings with abundant quantities of infectious material, and, moreover, in the most favorable form for the causing of infection.

When the tuberculous bacilli are inhaled in dust-form, then they can either remain in the upper air passages or force themselves into the alveoli just as is the case with other inhaled particles of dust. The depth to which they enter the respiratory tract will depend essentially on the manner of breathing; if breathed deep and with open mouth, they will get in farthest. Breathing through the nose will, on the contrary, guaranty a certain protection against the entrance of the bearers of the infectious material, since a considerable quantity of dust of the air breathed is retained by the mucous membrane of the nose. But whether the tuberculous bacilli, when they reach the bronchii and alveoli, are able to take firm hold and establish themselves will depend on many circumstances. Especial influence on this will be exercised by the slow growth of the tuberculous bacilli. Other disease-producing bacteria, for example the anthrax bacteria, appear in consequence of their rapid growth to grow very soon to such an extent and to exercise so quickly a harmful influence on the cells in their neighborhood, that the ciliated epithelium of the mucous membrane of respiration is no longer able to master and dispose of them; they can on that account establish themselves in the upper sections of the respiratory passages and call forth the pathological processes peculiar to them. This is taught by the wool sorters' disease and especially the affection running its course under the term of anthrax of the larynx. Quite different are the relations for tuberculous bacilli. These need as many days as the anthrax bacilli hours to reach a development worth mentioning, and before they reach it are in ordinary circumstances usually ejected by ciliary motion of the epithelium long before this. Therefore specially favorable moments must come to make their establishment possible. These are certainly brought about by many conditions. Nevertheless, the most important and most frequent helps for the establishment of the infection appear to be furnished by such diseases as, for example the measles, for a time rob the mucous membrane of respiration of its protecting epithelium, or which furnish stagnating secretions in which the tuberculous bacilli can establish themselves. Also, and that correctly, attention has been called to the fact, that by adhesions of the lungs and imperfect form of the thorax, which hinder a sufficient movement of the lungs and which are especially adapted to cause circumscribed collections of bronchial secretions, the arising of tuberculosis, that is the establishment of

the tuberculous bacilli, is favored. If one makes clear to himself the necessity of such favorable moments for the entrance of the tuberculous bacilli, then it can no longer appear so striking that many persons, in spite of constant association with consumptives, are not infected, while others are plainly infected at the first opportunity, and still others after they have been exposed to the infection for a long time finally, nevertheless, fall a victim to the same. In the case of the first mentioned nothing helped the tuberculous bacilli, which were doubtless often enough inhaled, and they were therefore removed again from the respiratory passages; the second had from the beginning a defective spot in their respiratory organs, on which the bacilli were able to fasten themselves, and it was only necessary that the infectious germ should reach just this spot; the last mentioned not until later had such a defect and lost by means of it to a certain extent their immunity from tuberculosis. The difficulties which stand in the way of the establishment of the tuberculous bacilli in the upper air passages are greater and this fact explains the rare cases in which they primarily become diseased.

Since by far the greatest number of cases of tuberculosis begin in the lungs, it is to be supposed that the infection in all these cases has taken place in the manner just suggested by the inhalation of phthisic sputum dried and made into dust. On account of the immense production of the infectious material and on account of the frequent contact in which it must come with other parts of the human body, it is nevertheless not improbable that the infection can take place from other parts than the lungs. So I would say, that the primary attacks of lymph glands lying on the surface arising from scratches, skin-eruptions, etc., into which tuberculous bacilli have accidentally entered, have formed the entrance gate for the infection, from whence the bacilli have been carried farther and have got into the lymph glands, then when the original point of infection has been healed, it appears as if the disease-process had developed primarily in the glands. A number of cases in which in otherwise healthy human beings caseous lymph glands containing tuberculous bacilli were cut out from the back of the neck, I could not otherwise explain, than that they arose through infection from scratches on the skin of the head. Since the excrement of consumptives not rarely contains tuberculous bacilli, the same is true in regard to the danger of infection from this as from the sputum, when there is opportunity for its drying and being scattered as dust. But this does not occur probably very often; all the same this possibility of spreading the infectious material is to be kept in view.

The second principal source for the tuberculous bacilli, namely, tuberculosis of the domestic animals, appears not to have anything like the importance of the phthisic sputum. The animals, as is well known, produce no sputum, so that during their life no tuberculous bacilli get from them into the outer world by means of the respiratory passages. Also in the excrement of tuberculous animals tuberculous bacilli appear to be only exceptionally present. On the contrary, it is a fact that the milk of tuberculous animals can cause infection. With the exception of this one way, therefore, the tuberculous virus can only have effect after the death of the animal and can only cause infection by the eating of the meat. Aside from the probably only rarely occurring cases of direct infection, which can follow from coming in contact with tuberculous parts of the flesh of little wounds and exoriations of the skin, the reception of the infectious material will result in this

case only by means of the organs of digestion, and in accordance with this the first appearances of the disease must first show themselves here. But now primary tuberculosis of the intestines is not at all frequent in proportion to primary lung-tuberculosis—indeed, a decidedly rare affection. From this it is to be concluded, that the infection in question does not often occur from eating the flesh of tuberculous animals. Probably it would occur frequently if the visibly diseased parts of the flesh were not put aside, as is usually the case, and if, as is almost invariably the case, the meat were not eaten cooked. Also especially it must be considered that the tuberculous eatable animals, especially the *perlsucht* of cattle, remains more or less localized, so that after all only the use of the tuberculously altered lungs, glands, etc., would be dangerous. That, nevertheless, the infection from the intestinal canal is indeed possible, is proved by the frequent cases of secondary intestinal tuberculosis of consumptives, which must be attributed to the swallowing of their own sputa. It is, to be sure, strange that, although it is to be supposed, that every consumptive swallows more or less of the tuberculous bacilli-bearing secretion from his lungs, nevertheless intestinal abscesses are not to be found in all. I explain this in the following manner: In the first place, the intestines appear to offer a still more unfavorable point of attack for the slowly growing tuberculous bacilli than the lungs. But further, the feeding-attempts with anthrax bacilli and their spores, have taught that anthrax bacilli, which contain no spores, are destroyed in the stomach, while the spores of these bacilli are able to pass through the stomach unharmed. On that account only spore-bearing substances can cause infection from the intestinal canal. The tuberculous bacilli will conduct themselves most probably in this regard, like the anthrax-bacilli, and only in case they are provided with spores will cause tuberculosis of the intestines, provided they do not go through the intestinal canal too quickly to render their germinating and establishing themselves at any point of the mucous membrane of the intestines possible. Just the same holds, of course, for the danger of an infection from tuberculous meat, and this circumstance may explain the relatively rare infection from the use of such meat.

The same conditions hold for infection from the milk of cows suffering from *perlsucht*. Before all things, if infection is to take place it is necessary that the milk contain tuberculous bacilli. But this appears only to be the case when the milk-glands themselves are tuberculously diseased. But since *perlsucht*-knots do not often occur in the udder, the milk of *perlsucht* cows will often possess no infectious properties. This explains immediately the contradictions in the statements of the various authors, who have made feeding attempts with milk from cows suffering from *perlsucht*. The one set maintain that they have gained positive results, and their statements are of such a sort that it is impossible to doubt the correctness of their observations. The others, on the contrary, could obtain no infection in the animals experimented with. This result is also correct. The positive results were then obtained from milk which accidentally contained tuberculous bacilli, the negative with milk which was free from bacilli.

If infection from tuberculous domestic animals in general does not appear to be frequent, it must by no means be under-rated. *Perlsucht* of cattle and the caseous changes in the lymph-glands of pigs are of so frequent occurrence that they deserve close attention. If, now, we follow the tuberculous bacilli which

have got into the lungs by inhalation, into the skin by wounds, into the intestinal canal by swallowing, in their further conduct in the body, we see that they often remain for a long time—sometimes even permanently—in the place of their first establishment. From herds of epithelioid cells they form little knots which enclose giant cells, and regularly from the centre out, fall victims to coagulation-necrosis. The appearances which are conditioned upon the gradual growth of such a herd, and the regressive changes which always keep step with it, have been described in detail in a former section. The first sign of the spreading of the tuberculous process into the neighboring regions is the formation of similar knots in the neighborhood of the primary herd. The way, also, in which the migration of the bacilli from the first herd to the place where the secondary knots arise, is to be conceived, I have also already suggested. The following appears to me to be the simplest explanation of this proceeding. The tuberculous bacilli, since they possess no motion of their own, can only be moved along by elements possessing the power of motion, or by currents of liquid. But since the tuberculous knots have no vasal and one cannot see how other liquids, which are in motion, can get into the tuberculous herd and sweep away bacilli from them, nothing remains but the wandering cells, which according to experience, act the same part in other disease-producing bacteria, which those elements perform, that provide for the transport of the bacilli. The cell, laden with a bacillus only goes on until, under the influence of the parasite, it loses its power of motion. On the spot where the cell came to a stand-still, a new tuberculous knot must arise. In this manner groups of tubercles form, which melt, perish and cause destruction in the well-known manner.

With the supposition that the wandering cells may be the bearers of the bacilli, we see in the most natural manner the connection with the farther excursions which the tuberculous bacilli make in the body in almost all cases. When the wandering cell moves in the tissue-passages and must rely on its own power of motion, then the distance which it travels is only a short one and the newly arising infectious herd must lie in the neighborhood of the point of departure. But as soon as the wandering cells move in the lymph-vessels and the lymph-stream comes to their help in their movement, then they travel greater distances, as is seen not seldom in the tubercles spreading themselves out in the course of the lymph-vessels. But very often then the tuberculous bacilli are swept away still farther in the lymph-vessels and led into the nearest lymph-glands, where in like manner as in the first place of infection they call forth the formation of knots and caseous degeneration. The changes conditioned upon this in the gland-tissue appear usually to hinder a further progress of the bacilli by the way of lymph-passages. But by this no insurmountable barrier is placed in the way of the progress of the bacilli. They can, under special conditions, get into the stream of the blood. This happens when, as Ponfick has shown, the tuberculosis attacks the thoracic duct, and reaches the interior of the same; the tuberculous bacilli are then led direct from the lymph-stream into the blood-stream.

A second, and moreover the most frequent cause for the entrance of tuberculous bacilli into the blood, has been discovered by Weigert. This is the formation of tuberculous knots in the walls of veins and the breaking through of the perishing knots into the lumen of the vasa.

A third possibility is suggested in the case described in the earlier pages of this paper, in which the bacilli grew into the lumen of an artery. In all these cases the bacilli were rapidly swept away by the blood-stream, scattered into the most various organs of the body and there established. If very many bacilli at one time got into the blood, then the conditions are exactly the same as in the experiment with the rabbit into whose ear-veins considerable quantities of tuberculous bacilli from a pure culture were injected. As well in the artificial as in the natural experiment, and in the same manner, tuberculous knots arise in great numbers, and moreover especially in the lungs, spleen and liver. Why these organs are so specially favored demands explanation. The connection between the localized tuberculous processes and the acute miliary tuberculosis which formerly appeared so enigmatical, and on that account has been characterized by many as impossible, has been made clear with unquestionable certainty by the discoveries of Ponfick and Weigert. This example of the manifold forms of a disease warns us forcibly against considering pathological changes, and especially infectious diseases only from an anatomical point of view unless forced to do so, but first of all to consider the ætiological relations as authoritative.

A considerable number of tuberculous bacilli do not always force themselves at once into the blood-passages. It can also occur that only comparatively a few bacilli are carried along by the blood-stream. Then there arise correspondingly fewer tuberculous herds, but which reach greater dimensions because in this case life is longer preserved, than when an immense eruption of tuberculous knots cause rapid death. Also in this matter the infection taking place in the natural way conducts itself just like that artificially generated. Sometimes only a very few bacilli get into the blood and only individual tubercles are formed, which then in course of time grow to considerable dimensions. This proceeding, which can repeat itself with intervening pauses, has been characterized by Weigert very fittingly as chronic miliary tuberculosis, in contrast to the acute, which, owing to the immense production of tubercles is quickly fatal.

To these last mentioned forms of miliary tuberculosis are joined those processes where, in certain places of the body, which are not easily susceptible to an invasion from without and apparently without a herd causing the infection, a tuberculosis confined to the spot is developed. This sort of process, among which the fungous carious infections are to be reckoned, arise strictly localized. One can scarcely explain their occurrence otherwise than that a single infectious germ, therefore a single bacillus, was deposited by the blood on the spot in question. But how is a single bacillus to get into the blood? Could it after being inhaled into the lungs get into the lung capillaries without previously causing in the lung itself a tuberculous herd? Such a supposition has to me little probability. The almost regular appearance of caseous or calcareous bronchial glands in the diseased conditions mentioned rather makes the supposition probable, that the lymph-glands are not always an unconquerable hindrance to the further progress of the bacilli, and that individual bacilli just as they are carried along by the wandering cells and the lymph-stream, can also by help of the wandering cells leave the lymph-glands in centripetal di-

rection again and by the lymph-stream be carried into the blood. I do not doubt that, as in almost every case of miliary tuberculosis, the point of departure for the infection can be shown, one can also succeed in all cases of localized tuberculosis of the inner organs, as well as of the bones and joints, when they are dissected to find some older tuberculous herd, mostly perhaps caseous bronchial glands, from which single bacilli could get into the blood. It is very probable also, that tuberculous bacillar meningitis of children in so far belongs here, as that in the same, although lungs, liver and spleen are very often free from tuberculosis, the bronchial glands are almost regularly found caseous, whence we may conclude that these latter in this case too are to be considered as the primary disease-herd. To be sure it is peculiar, that in this form of tuberculosis, in which plainly not single but numerous tuberculous bacilli are deposited by the blood, the pia mater is so favored a place of deposit.

If, as has already been shown in former parts of this work, the various forms of tuberculosis must be declared identical on account of the same qualities of the bacilli occurring in them and the cultures gained from these, as well as on account of the identity of the inoculating products proceeding from them, the progressive knowledge of their mode of originating gives new proofs of this supposition. At first sight, however different the forms of lung-phthisis, acute and chronic miliary tuberculosis, the affections of the glands and mucous membrane under the general figure of scrofula, tuberculosis of the bones and joints, of localized tuberculosis of single organs, as for example the kidneys and the intestines, may appear, we shall see without difficulty that they belong together when we look at their mode of formation. Only lupus offers in so far a certain difficulty in the identification with tuberculosis, as clinic observation state a distinction that cannot be overlooked in the conduct of lupus and undeniably tuberculous affections of the skin and mucous membrane. Nevertheless the ætiological reasons for the unity of these two diseases are too weighty to retire before this difference, which possibly may find its explanation in the individual disposition.

The relation is similar between the tuberculosis of animals, above all of perlsucht and tuberculosis in man. These also must on account of the identity of the parasites on which they are conditioned, be held to be identical with human tuberculosis in spite of the differences in the anatomical behavior and in their clinical course. It has, to be sure, been stated, especially with reference to perlsucht, that the transmission of this disease to man has not yet been certainly proved. On the other hand the following may be said: On account of the very slow development of the disease, the place and time of the infection and therewith the source of the same can no longer be confidently stated, when the first plain symptoms appear. On this account in the frequent inhalation-tuberculosis the mode of infection can be determined in a scientific manner only in comparatively few cases. Still less will this be possible in the much rarer cases of intestinal tuberculosis arising from the use of flesh or milk of cattle suffering from perlsucht, because here the uncertainty is heightened by the easily possible confusion with other much more frequent kinds of infection. It is therefore very questionable whether ever a case of human tuberculosis can without criticism be attributed to the use of the meat or milk of

tuberculous animals. But if one thinks, that to the most various sorts of animals (cats, rabbits, guinea pigs, field mice) by inoculation with masses of perlsucht and the pure cultures gained from them, a disease can be generated with the greatest regularity which anatomically is exactly like the disease caused by inoculation with tuberculous masses, and which kills the animals with the same certainty as the last, then it is not to be expected that man should be an exception to this disease-poison. If in the course of further investigations again a difference between the perlsucht and the tuberculous bacilli should show itself, which would compel us to consider the same as only near relations, we should even then have all cause to hold the perlsucht bacilli as suspicious in the highest degree. From the hygienic standpoint the same measures must be taken against it as against the infection through tuberculous bacilli, so long as it is not proved that man can bring perlsucht bacilli in contact with skin-wounds without danger, that he can inhale the same or bring their spores into his intestinal canal without becoming tuberculous.

The considerable variety in the course of the disease in various individuals of the same species, and in their sensitiveness to the tuberculous virus, appears to speak against a common classification of all the disease-forms conditioned by tuberculous bacilli. These are nevertheless appearances which reappear in more or less marked a manner. One helps himself in this case by supposing a different disposition for the disease, as well as what concerns the attack of the same and its more or less intense course, without that an explanation of the same is given by this characterizing of the appearance. A number of such differences in the form of tuberculosis is already simply explained by the difference of the point of infection. Then the quantity of the infectious material originally taking effect seems to be of essential importance. Single infectious germs are held within bonds more easily and for a longer time by the organism on account of their slower development, so that they remain localized; while, when many germs are imported at once, they support each other in their work of destruction. A definite representation of that which is characterized as individual disposition one can make for all conditions, in which according to our previous supposition, certain favorable moments, such as are afforded by defects in the epithelial covering of the respiratory mucous membrane, stagnating secretions, disturbances of respiration, etc., aid the establishment of the tuberculous bacilli.

If then a large number of the appearances combined under the expression disposition may be referred to simple and easily explainable relations, there nevertheless remain some facts hard to explain, or not to be explained, which compel us to allow the supposition of a disposition to exist for the present. This is above all the striking difference of tuberculosis in its course in children and in grown people; further, the undeniable predisposition of many families for tuberculosis. In the last case many cases of tuberculosis laid at the door of this predisposition might much better be referred to the increased opportunity of infection. One can also think of special predisposing causes belonging to the family character, such as inclination to catarrh of the respiratory organs, defective structure of the thorax. Nevertheless there are many observations relative to this point which do not admit of such explanations. Moreover,

single cases of the disease have already often taught that one and the same person is not at every time an equally favorable subject for the development of the parasites, for, as is well known, it occurs not rarely that tuberculous herds which had reached no slight extent, shrivel, make scars and heal. That is as much as to say that the same body which, at the invasion of the tuberculous bacilli gave a favorable breeding-ground for the same, so that they could increase and spread, gradually loses these favorable properties, changes itself into a bad breeding-ground and so sets a boundary to the further growth of the bacilli. There existed, therefore, in the same person at one time a disposition for tuberculosis and at another time not. Wherein this distinction is founded, whether in a change in the chemical composition of the juices of the tissue, or in physical conditions, that must be taught by later investigations. So much is certain, that such differences exist and there is certainly nothing against the supposition that similar conditions, favorable or unfavorable to the tuberculous bacilli, may exist in certain persons not only for a time, but also during the entire life.

What still concerns the much discussed question of hereditary tuberculosis, after what has just been said, I can express in a few words. No facts exist which justify the supposition that intra-uterine or extra-uterine tuberculous bacilli can be present in the organism of a child, without bringing about visible changes in a comparatively short time. But until now tuberculosis has been very seldom found in the foetus or in the newly born child, and we may, therefore, conclude that the infectious material has effect only exceptionally during the intra-uterine life. This supposition is confirmed by the fact that of my experimental animals, especially guinea pigs, which not seldom were pregnant before or after the tuberculous infection, none have borne young which were tuberculous at birth. The young coming from mothers tuberculous to a high degree were free from tuberculosis and remained healthy for months. In my opinion hereditary tuberculosis finds its most natural explanation, if it be supposed that not the infectious germ itself, but certain qualities favoring the development of the germs coming into contact with the body at a later period, therefore, that which we call disposition, be inherited.

The ætiology of tuberculosis, as it was here developed on the foundation of our knowledge of the tuberculous bacillus in detail, scarcely offers anything new. Cohnheim had represented tuberculosis as an infectious disease and described its ætiology correspondingly before the discovery of the tuberculous bacillus. In this direction, therefore, my investigations have brought no essential progress to science, and yet it must be considered as a gain that upon the very important question of the infectious nature of tuberculosis, which until then had been disputed by most, now such proofs are furnished as to admit of no reasonable objections. Not less important is it, that the tuberculous bacilli give a sure test of what in the future shall be considered as belonging to the territory of tuberculosis. The diagnosis of tuberculosis will in doubtful cases be made dependent upon the proof of tuberculous bacilli. Practice has, as is well known, made use of this aid to a great extent and moreover with complete success, and has thereby furnished a rich material for proving the correctness of my opinion of the importance of tuberculous bacilli. Already from

this an appreciable advantage has resulted in the discovery of the tuberculous bacillus. But it is to be hoped, that also in other respects something may be gained by it, which can be made useful in fighting the disease. After the experiments already undertaken no great outlook appears to exist in a therapeutic direction, of finding successful means of influencing the parasites in the body of the patient. I would lay so much more value upon the prophylactic measures. These must partly be directed to directly destroying the tuberculous bacilli by suitable methods of disinfection, partly they must strive to preserve the healthy from contact with the tuberculous bacilli in all those conditions in which a reliable destruction of the parasites is not possible.

It appears to me not to be too early to proceed against tuberculosis with prophylactic measures. But owing to the great spread of this disease, all steps which are taken against the same will have to reckon with the social condition, and, therefore, it must be carefully considered in what way and how far one may go on this road without prejudicing the advantages gained, by unavoidable disturbances and other disadvantages. It would lead too far to go into a detailed discussion of the prophylaxis in this place, and I reserve my views in regard to it for another opportunity.

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## GENERAL LYMPHANGITIS.

An article read before the California State Veterinary Medical Association,  
December 13, 1888, By DR. J. P. KLENCH, V.S.

There has been, for the last six years, existing among the equine species of California, and more especially amongst the mules, a general constitutional disease, which has proven fatal in nearly every instance, and that has caused death after several months of loathsome suffering and of pitiful distress, unless the owner, having lost confidence in the final curability of the affection, concluded to destroy the animal for the sake of humanity or self-protection.

This affection has not been, to my knowledge, submitted to a diligent study by any practitioner, nor has there been any particular description given of it by the veterinarian authors, with the exception of a few practical records that appeared in some veterinary publication.

I had the good fortune of following several cases in various localities of two counties from the very first start of the disease to the time the animals were destroyed, and took careful notice about the origin and the progress of the symptoms, as well as of the pathological lesions after death. I am

glad to have the opportunity to lay my opinion before a meeting of veterinary surgeons for their critical perusal.

*Causes.*—The causes are mysterious and can hardly be defined. Up to five or six years ago, this affection was little known, and has perhaps never been noticed before. Long continued rains and a subsequent inundation of the lower lands in all the valleys, caused the atmosphere to be moist, the nights chilly with heavy fogs that seldom cleared away before noon. Then it was that five or six months after that flood, this disease made its appearance amongst the mules of Roberts Island, near Stockton, and all along the tules and rivers, but soon the affection spread over the whole San Joaquin valley, up to the foothills, so that hardly any ranch in the valley was spared. Other localities of the State suffered from the same danger, and from that time until to-day this mule affection appears and disappears in the different counties, and seems to be permanently located in our State. Work, care or feed cannot be accused of having any influence in the development of this disease, as animals have been observed to be attacked while in pasture or at rest in the stable and adjoining corrals, receiving at the time a very substantial nourishment.

The question of contagion might be considered as causative, but must be rejected as doubtful, until evident proofs are brought forward based on direct inoculation. My own experience is rather a proof against the contagious character of the affection, as I will relate it later. In the majority of cases, the disease was in all certainty of a spontaneous origin, and could not be traced to any particular cause by the owner. It seems rather to be due to a special climatic influence, that had the same effect in distant lying localities of the State at the same time.

Physiological works tell us that the secreting organs or glands are far less active in mules than in horses, and daily experience teaches us that in general mules will perspire and urinate less than their equine companions in the same team. A similar fact has been noticed concerning the salivary and intestinal glands. This circumstance explains why mules re-

quire less water for daily use, and why their muscles and tissues are more dense, more hard, more tenacious and resisting. It also tells us why the blood of the mule is less deprived of its impure deleterious elements, and, therefore induces me to consider this impure condition of the blood as a *possible* cause of this disease.

*Symptoms.*—They are regular in their expression and effect but two modes of eruption. The disease might break out on the legs and the body, or in the upper passages of the respiratory organs. The first indication of the disease will be dullness, loss of appetite and falling off in general condition, which might take place two or three weeks before any other symptoms appear. Swellings will then be noticed on one or several legs, causing lameness, or on any other part of the body; sometimes they affect the upper parts of the limbs more than the lower parts, and generally send out one or several cords to the nearest ganglion. They are painful, more or less œdematous, of firm, but not hard resistance, and will be covered in a few days with numerous lymphatic cords, especially when they are located over the muscular regions of the hind legs, neck and breast. In a few days more these cords, soft on pressure, become knotty: every lump becomes soft, opens and forms a wound, giving exit to yellow-whitish fluid, resembling thick coagulated lymph. Those abscesses located on the lymphatic vessels, evacuate a great amount of fluid, coming from two, four or six more buttons, situated on the same vessel. After the opening of the abscesses, the lymphatic vessels retract, remain soft so that they can hardly be felt. Such buttons as are located on hard underlying tissues, like joints or bones, are small, and situated in the derm of the skin, containing only a little fluid. The tumors on the muscles are located deep, cause a great deal of pain when the animal contracts the muscles, and take eight to ten days to reach the skin. They are large and form a regular cavity. It is noticeable that when a great many abscesses have opened, the animal shows relief, his appetite improves and his movements are easier.

The sores resulting from these abscesses are red, rough,

bleeding easily, with smooth borders injected and swollen, but not indurated, and secrete good matter. Most of the sores will heal and never conglomerate. The smaller sores will cover with a brown sticking crust, upon the removal of which I never noticed the wound to have the tendency to become larger in circumference or deeper at the bottom. The large abscesses on the muscles will, after being opened with the bistoury, often close and fill up again. The fluid running out of the abscesses in vessels always retains the same character, unless farcy complications arrive, as will be shown later. These wounds generally undergo a healing process, and many will cicatrize in the first period of the disease, when the animal is yet possessing his natural strength and vitality, while at a later stage general debility reducing the vital powers, retards and obstructs the cicatrizing process. Especially is this the case when the affection narrows the respiratory passages and seriously interferes with the proper aerization of the blood in the lungs.

It has been observed in all cases that in a few days after the appearance of the first abscesses, more lumps will daily form on different parts of the body and pass through the various stages of tumors, abscesses and running sores, so that in a short time the animal is literally covered with cords, lumps, abscesses and suppurating wounds that give the most disgusting sight one could have of a living animal.

But in the meanwhile complications arise in the form of gangrene in the nasal membrane. This symptom very often appears before the outbreak on the skin and constitutes the second modus of eruption of this disease.

At first there will be a light watery discharge for a few days; nasal membrane is red, congested; then a large brown crust will be seen sticking to the nasal septum, caused by the drying up of the matter secreted from the surface of a large wound; the nasal discharge is heavy, white, foamy, watery, mixed with blood and serosity, of a bad odor or not, falling down without sticking to the borders of the nostrils. Inside of nasal cavity there will be discovered sores of various sizes, from that of a pea to that of two or three fingers, extending

far upwards in the cavity; sometimes parcels of the membrane hanging loose, being only partially detached; the cartilage bare, necrosed, thin, of a dirty bluish-green color, and most often pierced through, opposite the nostrils, so as to cause communication between the two cavities. I am convinced, from my observation, that this destruction of cartilage is not due to ulceration, but was caused by gangrene, due to want of nourishment after all the vessels were destroyed. All these sores are red, injected, with a rough, soft bottom, bleeding easily, with borders congested and tumefied. The membrane of nasal wing is smooth, tumefied, shining and often ecchymotic. Every day the sores are increasing in surface. Sometimes small spots will be noticed, greatly resembling a glandered ulcer, but upon closer examination I could never detect any induration; nostrils are sometimes a little swollen; very seldom does the conjunctive membrane show any modification. Intermaxillary glands are soft, long or very large, painful, irregular, knotty on their surface, two or three glands existing at the same time. All are movable and free of any adherence with bone or skin. Respiration will be very laborious, wheezing on account of the œdema glottidis.

During all this time the animals have a shining, lustrous coat, skin loose and hair smooth and glossy. They eat little and grow poorer from day to day, so that at the end of one month or so, if they are allowed to live, they become entirely emaciated. But some keep up a good appetite and remain in good condition for a long time, having a tolerably fair appearance yet after five or six months.

*Post mortem examination.*—The following is the correct description of the lesions found in the mule of David Kerr, near Modesto, killed August 1, 1888, with a bullet in the head. An artery was struck, and death was caused from loss of blood, a large solid coagulum of black blood filling the trachea and bronchias. Lungs, liver, spleen and kidneys in a normal condition, perfectly sound. Bronchial ganglion lightly tumefied, two intermaxillary glands swollen, soft, loose, resembling a lymphatic vessel duplicated, full of coag-

ulated lymph. Several buttons in the derm hard, a few of them beginning to soften nasal cavity. Membrane of both sides rotten, gangrened in toto; lower part of septum pierced; cartilage bare to the width of  $1\frac{1}{2}$  inch by 3 inches long; parcels of membrane œdematous, congested and ready to sequestrate; here and there a spot more or less wide, having the appearance of an ulcer; but the borders are red, smooth, irregular, not indurated; fold of nasal wing a little œdematous, but membrane smooth and regular. Inferior turbinated bone full of suppuration and partially gangrened or congested; the superior turbinated bone less affected, only a few spots attacked by gangrenous ulceration. In larynx one spot necrosed on the epiglottis; mucous membrane less vascular, but tumefied; small spots of the size of the head of a pin, like beginning of necrosis. All muscles of the body diminished in volume, of black, very black color, the intra-muscular connective tissue very dense, while the adipose tissue between the muscular fascioli is totally absent. A great deal of fat was found outside and between the layers of abdominal muscles; large adipose tissue in the mesentery and around the large intestines as well as on the costal regions. I was surprised to see the intra-muscular absorption so great, while the adipose tissue remained abundant in other parts of the body. In the meantime, the mule appeared, while alive, to be entirely emaciated, and was sick for about five or six weeks.

*Diagnosis.*—It is very difficult to form a positive diagnosis of this affection on account of its recent origin and its numerous points of resemblance to other diseases, and above all to glanders and farcy. I cannot deny having found many animals that have been suffering for some time where the benign and the malign type exist together, and then the farcinous character becomes the most prominent symptom. In order to avoid too many misunderstandings, I will as briefly as possible describe the typical characters of glanders and farcy. They are represented by buttons, cords, tumors and swellings, which are all at first painful, enveloped in an œdematous infiltration that is absorbed in a few days. Then they become hard, indolent, after that soft, and in two, three or

four weeks will open and form an ulcer. All these lesions pass through the same pathological modifications, and acquire, therefore, a perfectly uniform character common to all glanderous and farcinous lesions. It has been admitted by all veterinary authorities that the morbid element of glanders and farcy is deposited by nature in small spots or noduli, which are found in the skin (farcy), or in the mucous membrane of the respiratory organs, or in the tissue of the lungs or other organs (glanders), and cause a total degeneration of the local tissues, which always will mortify in one piece and then form an ulcer, (when in contact with the air), or become encysted (when in the viscera). The cellular tissue enveloping these noduli is at first inflamed, and in a few days becomes hard, dense, indurated, causing the adherence of all parts concerned, whether it be located around an ulcer, of either nasal cavity or skin, or around a cord, button, or any kind of tumor or gland. This is so reliable and constant a symptom, that I would consider it as the *infallible basis* of all differential characters with other diseases, and state that *whenever this induration does not exist around an ulcer, button, cord, tumor or gland, there is not, nor can there be chronic glanders or farcy.*

The *buttons* have the size of a cent, hickory nut or olive. The large ones are subcutaneous, the lenticular ones are located in the derm and conglomerate. When they are softening, the skin becomes adherent to what remains hard in the button, which is only soft in the centre; the hair falls off and vitality ceasing, the skin mortifies in one piece and the wound produced is an ulcer.

The *cords* are long, flexuous swellings, located in the subcutaneous tissue or in lymphatic vessels, coming especially where large veins run close to the skin, and concentrating generally towards the ganglions. They always start from an ulcer or accidental wound.

The *tumors* are similar to the cords, only of larger dimensions, are found especially on costal and cervical regions. They seldom open and exceptionally form ulcers, but remain soft cavities.

The *ganglions*—*tumors or glands*—are round, hard, of irreg-

ular surface, adherent and of very dense indurated tissue, which sometimes forms abscesses; in that case, the rest of the gland forms a very hard kernel with an ulcerous, fistulous opening. I will mention yet as a farcinous tumor, the indurated tumor of the testicles and their envelopes, called sarcocèle.

The *swellings* are found in the limbs, affecting one or several joints, and in a short time the whole leg; after the inflammatory period has passed, they become hard and covered with cords and small buttons, and of course later with ulcers. At the same time other cords will emanate from these swellings to the corresponding ganglion. This cordeous appearance is the principal character which will distinguish the farcy swelling from other spontaneous œdemas of the hind legs, but due to different causes.

The *ulcers*.—All the above formations will finally produce ulcers. They are regular, circular, with indurated borders; bottom always shows small indurated granulations of a pale-lead color; they have a tendency to increase in depth and circumference, and are refractory to cicatrisation with a few exceptions. The fluid running out of these abscesses is albuminous, oily, but dries up and forms a brown sticking crust. Often ulcers close to others join together and form one large ulceration.

*General appearance*.—The hair is staring, without lustre, falling off easy on mane and tail; coat dry, adherent. Soon symptoms appear in the nose, characterizing the chronic glanders.

*Nasal cavity*.—In light farcy affections nothing might be found in the nasal cavity except a pale colored membrane, but later on a discharge will take place from both nostrils, or but one, and that generally on the left side. The quantity of the nasal discharge is of very little importance, but when the discharge is thick, of a dirty-gray color, mixed with a greenish or sanguineous aspect, and leaving brown crusts, sticking, gluey, attached to the borders of the nostril, it is characteristic of glanders. Nasal membrane pale, of a leaden color or marbled; sometimes, one or several ulcers are noticed on the

septum or under the nasal wing; these ulcers are small, circular like, punched with indurated turned up borders; bottom rough, pale-grayish, indurated, with a tendency to increase. Under the fold of nasal wing, membrane thickened, yellowish or purple, rough, with hypertrophied follicles, and often one or two miliary tubercles, that are very characteristic. Almost in all cases, there is a peculiar unpleasant odor manifested with the expired air, which would recall the odor of a rotten onion. Whenever the disease has progressed so far as to affect the lungs, we will hear a singular cough, dry, short, aborted and never repeating. I used to call it the glandered cough.

The *pathological lesions* after death are many miliary tubercles in the lungs, containing a fibrinous, purulent or calcareous substance according to the period of their formation. Sometimes several tubercles unite, become soft and form a *vomique*. On the inferior border of the lungs can be found an induration of white or grayish, seldom of real color; this also can become soft in the centre and form a *cavern*.

*Nasal cavity*.—Besides the above lesions already described more or less ulcers or ulcerous erosions. Seldom ulcers penetrate to or through the septum; turbinated bones contain a purulent, thick foetid matter; the osseous lamellæ are deformed and often show one or several ulcerations.

*Sinuses*.—Mucous membrane thickened and filled with caseous thick matter of bad odor; often ulcers are found in larynx. All farcinous tumors, glands and swellings are formed by dense indurated cellular tissue, hard to cut, and containing a few small abscesses. Lymphatic vessels or cords filled with pus and enveloped by indurated cellular tissue.

In *acute glanders and farcy* we notice farcy buttons and ulcers appearing on the skin at the same time as the glandered lesions in the nasal cavity; all morbid formations pass through their various phases in a few days, and give exit to a yellow fluid mixed with blood; the ulcers produced have irregular borders, reversed, injected and tumefied, bottom red, dead color, secreting a serous-yellowish fluid that seldom dries up or forms crusts; glands swollen, soft, œdematous, free of ad-

herence, often absent ; nasal discharge double, thin, yellowish-colored matter and mixed with blood. Nasal membrane injected with a yellowish infiltration or covered with petechial. Nasal ulcers isolated and circular or conglomerated, forming a large irregular wound, borders tumefied and injected ; bottom of ulcers granulated, red and bleeding on the lightest friction. Sometimes these ulcerations penetrate to and through the nasal cartilage, establishing a communication of both cavities. All ulcers enlarge in a short time, and between them the nasal membrane is infiltrated with a fibrinous or albuminous substance, that becomes soft and causes mortification of the membrane on a very large surface.

There are always lenticular buttons, that mark a beginning chancre. Acute glanders always causes death in about six days.

*(To be continued).*

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## THE MANIA FOR INNOVATION IN THERAPEUTICS.

BY T. W. TURNER, Ph.G.

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At no time in the history of medicine have there been so many remedies offered to the medical and veterinary professions as in the present decade. Every new medical discovery is first published in some trade journal, which claims for it superior physiological properties. The recorded cases in which the new remedy may have proved a success are diligently investigated, it is tried wherever possible, the pros and cons of its merit widely discussed, till it is in its turn superseded by something newer, and before much is known about the remedy it is—forgotten.

This constant passion for new therapeutic remedies, which may at times embarrass the professions, sometimes proves a benefit to suffering man and beast. This tendency of the times to produce or invent something new is felt in materia medica as well as in every department of intellectual life. The vegetable remedies, such as roots, herbs, seeds, barks which in former days occupied the most prominent place in pharmacology, have been gradually replaced by the products

of the laboratory. The former have in general a very complicated composition, and possess several active principles, while chemical compounds have a more simple composition, owing to which a more specific physiological action is produced, nor does any undesirable additional activity arise. This overcrowding of the pharmacopœia with new remedies, the topical result of the rapid progress in chemistry, though based on scientific principles, has without doubt its disadvantages. The remedies are examined only by a few investigators, and therefore fail to be sufficiently known in regard to their therapeutical value, and especially to their physiological action.

As soon as the real character of the remedy is partially ascertained, new ones appear, seemingly more valuable, and those of yesterday are cast aside before they have been put fully to the test.

This constant experimenting can hardly be of much benefit to the progress of sound medicine, since it leads to superficial and partially established results. In view of this love of innovation of the present day, the words of Dr. Hufeland, in his work "How to Prolong the Human Life," ought to be well and deeply pondered. He says: "Every sickness is attended with irritation and loss of power. If a remedy influences bodily conditions more than the disease itself, we certainly have restored the patient to health, but he has been more weakened through the process of recovery than he would have been through the action of the disease alone. This is the case nearly always if, in trifling cases, the most powerful and heroic remedies are employed. Diseases may be treated according to different methods and principles. These different methods may all bring a patient back to health; but as regards the prolongation of life, they may be of very different degrees of value. The longer it takes a remedy to effect a cure, the lower the vitality of the system sinks, the more are the powers of the body enfeebled, and the hopes of prolonged life are diminished in proportion to this therapeutic inertia. If, on the other hand, the digestive organs, for instance, are the seat of disease and become

weakened through the action of powerful remedies, or if without necessity the remedy attacks the vital force in general, the more it will weaken the foundation of life, even though it should relieve the disease. Last, but not least, it should not be forgotten that disease at times is nothing else but an effort of nature to eliminate morbid material or to distribute centers of stagnation—an attempt to restore the lost equilibrium. If in such a case the physician tries only to relieve symptoms of the disease, without trying to remove the cause, he opposes the efforts of nature. An ideally perfect remedy should be entirely proportioned to the gravity of the disease. Its action should be such that it does not allow the disease to gain unnecessary headway and so impair the forces of the body that the chances of longevity are diminished. On the other hand, its action should not be too violent, lest while it abridges the course of the disease it is intended to combat, it may light up others, or interfere with the general function of the body, and so seriously affect the prolongation of life.”

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## EXPERIMENTAL PATHOLOGY.

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### A RAPID METHOD OF DIAGNOSIS IN GLANDERS.

BY I. STRAUS.

The prompt and early determination of the truth in cases of suspected glanders in the horse is frequently a matter of the first importance, and when the diagnosis is sought for through the inoculation of other animals with the morbid products of the patient, the knowledge of those which possess the highest degree of receptivity and the quickest susceptibility to the infection is of course of the greatest advantage. Among those which are endowed with a special susceptibility in this respect, the donkey is probably entitled to the foremost place, not only because of the promptness with which the inoculation “takes,” but also because of the rapidity of its development after the inception of the disease. But the high value of the donkey in the market practically precludes

its use for such a secondary purpose, and of course it becomes necessary to select some other organism, if not equally available, as nearly so as possible. The rabbit, which has been made the subject of trial, is comparatively valueless for the purpose, the product of inoculation being little more than an insignificant ulcer slow in its development, and not always followed by generalized symptoms. The field mouse has been shown by Messrs. Loeffler and Schutz to be possessed of an excessive sensitiveness to the action of the bacillus of glanders, dying in a space of time varying between two and eight days, exhibiting moreover extensive and characteristic visceral lesions. But it is not always easy to obtain these animals, and as moreover they show a greater susceptibility to septicæmia than to glanders, and as the septic and glanderous elements may become combined, both as to the virus which is injected and the resulting lesions, the result can scarcely be trusted as furnishing any reliable testimony, such as the careful practitioner should always demand, and the field mouse must also be rejected as of no practical utility in the case in hand.

The availability of the guinea pig is next brought to the test. Messrs. Christol and Kiener were the first to experiment with these animals, and to prove their susceptibility to glanders. When inoculated under the skin, they generally die in from twenty-five to fifty days, during which period they not only exhibit the glanderous abscess at the point of inoculation, but also lesions of the lymphatic glands; of the liver; the spleen; the articulations and surrounding tissues; and also, the lesions of the testicles, to which I will now call special attention.

It is ordinarily ten or twelve days after a sub-cutaneous inoculation that the testicles become tumefied, the swelling being at first about the size of a walnut, or even larger; the scrotal skin becoming tense, red and shining, and often breaking and allowing the escape of glanderous pus. This constant elective localization in the testicles in guinea pigs is altogether characteristic of glanders.

When instead of inoculating under the skin, I have introduced the virus into the peritoneal cavity, I have observed

the remarkable fact that the tumefaction of the testicles, instead of showing itself only after eight days, had become well marked as early as *the second or the third day* after the inoculation. On the eighth or tenth it has reached considerable proportions, and death has occurred earlier, generally in from twelve to fifteen, and sometimes in from four to eight days.

The peritoneum and viscera of a guinea pig killed two days after having received a peritoneal inoculation of a small quantity of the culture of the bacillus of glanders, will generally preserve a healthy appearance. But if the tumefied testicles are examined, lesions appear of a nature more advanced and characteristic. Mr. Loeffler has pronounced these lesions to be a glanderous orchitis, or epididymitis, but this is an error, the lesions always beginning in the vaginal sac. From the second day following the intra-peritoneal inoculations, both layers of the vaginal serous tissue are literally covered with a mass of white-yellowish granulations, of the size of a pinhead, and on the third or fourth day these layers become intimately united by a thick, purulent exudate, and rich in bacilli, the scrotum at the same time becoming adherent, inflamed and red.

If the tumor is divided, the testicle proper, as well as the epididymi, are seen to be free from lesions, which do not extend beyond the tunica albuginea, the testicular substance being at the same time perfectly healthy.

Out of forty post mortem examinations of animals killed by sub-cutaneous or intra-peritoneal inoculations, only two presented testicular lesions. It is not then, as has been believed, an orchitis or epididymitis of a glanderous nature; it is only the testicular envelopes, the vaginal sac, and then the scrotum, which are primitively and exclusively affected. This exclusive *localization* in the serous sac of the testicle is observed in both forms of inoculation, but in the peritoneal it takes place *much sooner*, having been observed even as early as the second day.

This rapid and characteristic localization of the diseased process of glanders upon the testicular envelopes in the guinea pig, may then be utilized in ascertaining the glanderous

nature of a pathological product. All that is necessary is to take as the testing animal, a *male* guinea pig and inoculate him in the peritoneal cavity, and if within two or three days the testicles become tumefied and prominent at the ring, we may by this fact alone feel justified in affirming, almost with certainty, that the inoculated substances have contained the bacillus of glanders.—*Archives de Md. Exper.*

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## REPORTS OF CASES.

*“Careful observation makes a skillful practitioner, but his skill dies with him. By recording his observations he adds to the knowledge of his profession, and assists by his facts in building up the solid edifice of pathological science.”—VETERINARY RECORD.*

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### CYCLOPS MEGALOSTOMUS ARCHYNCHUS.

By S. C. ORR, V.S., Manhattan, Kansas.

*Editor Review:* On the morning of the 20th of June I was called to attend a case of difficult parturition in a mare. Upon examination I found an anterior presentation with a deviation of the head upwards and backwards and the foal dead. After several unsuccessful attempts to bring the head to the proper position, I concluded it would be necessary to perform embryotomy to save the mare. After a long and tedious operation the head and neck were severed from the body close to the shoulders and each removed separately, and the subject of the accompanying cut is what I found. The body was that of a well-formed colt, but the head had the superior maxillæ two inches shorter than the inferior, and the pre-maxilla very rudimentary and entirely cartilaginous, nasal chambers and posterior nares entirely absent, but well-formed pharynx and fully developed velum pendulum palati, so that had it been born alive, existence would have been impossible. The eyes, instead of being in their proper places, were both combined in one large eye located in the center of the forehead. There were two pupils, two distinct lower lids and one upper, and the eye-ball very prominent. As the mare has been kept near the railroad it is thought by some that this strange freak of nature was caused by sudden fright at

the train after night, as the eye somewhat resembles the head-light of a locomotive. The specimen is being prepared for mounting.

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#### AMPUTATION OF THE PENIS OF A GELDING.

By L. C. WAKEFIELD, D.V.S., Montpelier, Vt.

April 10th, 1888, Mr. Gordon, a liveryman, came for me to make an examination of a bay gelding, about twelve years old, which had lately come into his possession. He got him of a stranger and supposed him to be sound until he began to notice a very bad odor from the region of his sheath. Mr. Gordon directed his hostler to cleanse the parts and in doing so found what he called "a large wart" on his penis.

I attempted to make an examination without casting, but on account of the manipulations previously made by the hostler the horse had become very uneasy and resented every attempt at examination; accordingly I cast and secured him for an examination. The odor from the parts being almost unendurable, I washed them first with a solution of potassium permanganate and then with a solution of phenic acid. On examination I found an epithelioma, the size of a turkey's egg, on the inferior surface of the glans penis; the growth had an attachment about an inch in diameter. The whole surface was ulcerated and had a granular appearance and the ulceration seemed to extend into the urethra some distance. That portion of the prepuce that came in contact with the abnormal growth was also ulcerated.

The surface of the growth bled easily when touched. As there were two or three small growths on the superior surface of the glans, I advised the amputation of a portion of the penis, but Mr. Gordon, wishing to have an understanding with the former owner, would not consent to an operation then. So he waited until the 20th of the same month, when I cast and secured the horse for an operation. I disinfected and deodorized the parts as before, and then fastened a cord around the penis just back of the glans and a second one around the base of the free portion of the organ, so that in case the assistant

should lose his hold of this portion of the organ after the amputation, it could be drawn out by the cord. My assistant having a firm hold of the organ with his hand, I first made an incision with my scalpel through the prepuce and urethra about two inches posterior to the glans; I then finished the amputation by *ecrasement*; considerable hæmorrhage following from the posterior dorsal arteries of the penis, I ligated them with carbolized catgut. To prevent the urethra from closing during the process of healing, I sutured the same from the superior, right and left borders to the corresponding borders of the prepuce, thus bringing a portion of the prepuce over the stump of the organ and forming, as it were, an artificial glans. I first used catgut for the sutures, but that not being strong enough, I substituted silk instead. The parts were cleansed with a three per cent phenic acid solution and the horse was allowed to get up. He was put on a laxative diet; tonics and mild diuretics were prescribed and light exercise given daily. The parts were syringed out daily with the phenic acid solution. The temperature was slightly elevated for three or four days. Urination was performed without difficulty and the wound healed well without any disagreeable odor. At the end of three weeks after the operation, the animal would bring the stump in view and a person ignorant of the case would hardly detect the absence of the glans, on account of the folding of the prepuce over the stump, forming, as it were, an artificial glans. At present the animal is doing his daily work with no appearance of any morbid growth on what remains of the once affected organ.

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#### IMPERFORATE HYMEN IN A MARE.

BY THE SAME.

The subject was a three years old mare. About three months ago the owner noticed what appeared to be a tumor, the size of a turkey's egg, protruding from the vulva, especially after micturation and while going up-hill. The owner thought from the opinions of other horsemen that the mare had a hernia and so called me to examine her. I found that

the tumor was easily reducible and evidently contained some fluid. On replacing the tumor, I found no opening beyond the meatus urinarius, and that the vagina ended in a blind pouch, consequently I diagnosed an imperforate hymen. I drew the hymen to the surface again and opened it freely with a crucial incision. Quite an abundant discharge, yellowish and viscid, came away after the incision was made, which I diagnosed as a part of the vaginal and menstrual discharges which were unabsorbed and had no means of exit. The hymen was a strong and unyielding membrane and nearly as tough as ordinary integument.

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#### IS IT EQUINE SYPHILIS?

By W. R. CLAUSSEN, V.S., Waupana, Wis.

Some time in May I was requested to see a Percheron stallion, property of Mr. R. A. Amherst. On examination I found the penis and prepuce swollen and covered with ragged chancre-like sores, also a slight, inoffensive mucous discharge from the urethra. To my inquiry I was told that the animal the week previous had served twenty-three mares in three days, had appeared all right till that morning, when Mr. R. first noticed the sores and swelling. I felt satisfied the sores must have been in existence for some days, although the man in attendance insisted that the horse was "in the best kind" of shape the evening before. The temperature was normal and the appetite good. I termed the disease chancroid. I have afterwards found in one of Professor Anacker's works, mention of blennorrhæa urethræ. Professor Anacker asserts the disease may be produced by mechanical irritation from excessive coition or by the introduction of some foreign body in the urethra, either from the bladder or from without, first as a simple urethritis, the irritation later on spreading to the glans penis and prepuce. The authorities at my disposition do not mention the disease as contagious only from females to males, but I must regard it as otherwise, for a few, (seven or eight) mares that had been served during the three days previous to my visits to the stable, and the only ones

served after the twenty-three mentioned, were brought to me for treatment in the course of from five to twelve days after I first saw the stallion. My first visit was on Thursday, my second was on the following Monday, and during my stay this time three mares were brought there. Of these two were affected; the third had been served about two weeks before and had no symptoms of disease. None of the twenty-three have been heard from as diseased, so I presume it safe to conclude that the disease was the direct result of urethral irritation brought about by excessive copulation. Of the mares some had a few sores on the vulva and nothing more; in others a scanty, but most repulsive, curdy discharge was established. The animals were successfully treated with mild astringent solutions as a wash and iodoform ointment. Some of the worst looking sores were touched with nitrate of silver. Inwardly was employed the iodide of potassa combined with the fluid extract of stillingia.

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#### EPITHELIOMA OF THE EYE-BALL.

By M. E. O'CONNOR, D.V.S., Denver, Col.

I send you to-day by express a horse's eye, the case of which I believe interesting. The following is the history: On the 25th of June I was called to see the horse, a valuable one. I examined the eye, and found that the growth was on the eye-ball. The owner did not agree with me, as an M. D. to whom the horse belonged before coming into the hands of the present owner, as well as a veterinarian, had treated the eye for about eight months; they both concluded it was on the eye-lid. How they could have come to that conclusion was and is still a mystery to me. I was told that the veterinarian chuckled when he heard of my diagnosis, yet that did not worry me. I told the owner I could do nothing for the horse but remove the eye; he suggested that I should cut away the growth. I did so, casting the horse, and using a five per cent. solution of cocaine, afterwards using the solid nit. argent, in spite of which the growth flourished, and did remarkably well. I told the owner that my treatment was

of no avail. I should have remarked that the growth bled freely on the slightest provocation. He told me to go ahead and do what I thought best, which I might say, was the removal of the eye, as the growth was so large it was impossible for the animal to bring the lids over it. I cast the horse and chloroformed him, removed the eye, with a very little loss of blood, filling up the cavity with absorbent cotton, and tinct. chlor. fer., which I allowed to remain for twenty-four hours. I then removed it and inserted cotton, with a twenty per cent. solution of carbolic acid. I performed the operation on the morning of July 15th and up to date the patient is doing splendidly, eating his bran mashes three times a day with nit. potass.  $\frac{3}{4}$  ss. in each feed.

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#### ANTIFIBRINE IN VETERINARY MEDICINE.

BY O. BONVICINI.

The experiments here referred to were tried upon thirteen horses suffering with influenza (thoracic form); seven affected with severe angina; one colt sick with suppurative pleurisy, following a pulmonary abscess, and another having rheumatismal polyarthritis. Trials made upon two healthy donkeys had proved that ten grammes of the drug could be given without danger.

With doses varying between eight and ten grammes, the temperature was always lowered, even in the most severe cases. The hypothermia began about one hour after the administration of the drug, and reached its height after three or four hours, remaining stationary for two, three or four hours, and then returning to its original point. Generally, one dose was sufficient to modify the thermic curve for a period of six to ten hours; if a longer effect is desired, a second dose may be given without fear, but this will not produce a new depression of the temperature, and if this has a tendency to rise its elevation is only retarded. During the remissions thus produced by the drug, a well marked improvement in the general state of the patients was observed; collapse or functional disturbances have never been seen. A lowering of the

temperature of two to two and a half degrees is the result of the administration of eight to ten grammes of antifibrine.—*Ercolani*, 1888.

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#### A CASE OF CUTANEOUS PAPILLOMA IN A COW.

BY PROF. VIGEZZI.

The subject of this observation was a two-year-old heifer; the tumors being generalized in almost all the regions of the body, and varying in size from that of a small nut to that of a child's head. The largest warts were removed with the bistoury, the excisions being performed on two different occasions. The total mass removed weighed about eleven pounds. The author suggests some interesting considerations upon the pathogeny of warts and their curious mode of elimination.

In 1871 Richter published a paper containing sundry observations of warts in man, in which he speaks of seeing between the central substance and the periphery micrococci which, no doubt, were the agents of contagion. This case of Richter passed unnoticed, and ten years later, in 1881, Maiocchi discovered in a cow the presence of a special organism to which he gave the name of *Bacterium porri*.

Maiocchi and Piana succeeded in inoculating upon themselves the discharge from the wart of a cow, and Vachette showed the contagiousity of bovine to bovine. This transmission is difficult to reproduce experimentally, and the author obtained no results upon a donkey, a dog, or a goat with warts from the cow.

As to the mode of elimination of the warts, Ercolani has studied them and his conclusions are proved by the researches of Maiocchi. It is the result of an obliteration of the blood-vessels whose internal epithelial coating becomes hyperplastic; sometimes also there is endarteritis and periarteritis, the two processes being two forms of obliterating angioitis.—*Resoconto de la Univ. di Parma*.

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EXPERIMENTAL RESEARCHES WITH TETANIGENOUS EARTH.

BY PROF. A. GOTTI.

In a paper read before the Academy of Sciences of Boulogne the author presents the following conclusions:

“Experimental tetanus obtained in animals with tetanigenous earth is identical, from a clinical point of view, with that which results from accidental traumatism.”

“In the greatest number of fatal cases of experimental tetanus micro-organisms are found at the point of inoculation, as observed by Nicolaier and Rosenback in traumatic tetanus.”

“In the experimental disease passing from one animal to another, the alterations at the point of inoculation are lighter, by diminution or shrinking of the bacillus of Nicolaier, and it becomes more and more difficult to produce the disease by ulterior inoculations.

“And lastly, bacteriological researches in the humors and tissues of animals which have died with the experimental disease, show no retiform or spilliform bacilli, nor any other micro-organisms; the opinion of Rosenback, confirmed by Brieger, as to the action of toxic substances formed at the place of development of the tetanigenous germs is probably, then, the correct one.”—*Ercolani*.

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## CORRESPONDENCE.

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CALIFORNIA STATE MEDICAL VETERINARY ASSOCIATION—A  
CORRECTION.*Editor Review:*

DEAR SIR.—Editorially in the June number you say our bill has been signed by the Governor. But I am sorry to inform you of your mistake. The bill which we all worked so hard for passed the upper house, where it originated, and also the lower one by quite a majority, when a motion to reconsider was passed and the bill was killed by four votes. And it is only to be regretted that they could not have died with it.

The argument was that it would work a great hardship

on horse owners in the rural districts where no qualified men were available, and they had to rely on the ordinary quack, who knew more than they did (?) and if they were debarred from employing him they were greatly wronged.

We must be contented for two years and then we will try it again and try to profit by past experience.

We have lately organized a local Veterinary Medical Society here. It is very small in numbers, but perfectly harmonious and full of energy. We shall hold monthly meetings for discussions.

A copy of the rules will be sent you as soon as printed.

Yours respectfully,

R. F. WHITTLESEY, D.V.S.

LOS ANGELES, CAL.

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## SOCIETY MEETINGS.

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### CALIFORNIA STATE VETERINARY MEDICAL ASSOCIATION.

The quarterly meeting of the Association was held in the Baldwin Hotel, San Francisco, on June 12th, the President, Thomas Maclay, M.R.C.V.S., in the chair. Present, Drs. Klench, (Santa Rosa), Spencer, (San Jose), Wadam, (Santa Clara), Orvis, (Stockton), McCollum, (Sacramento), Egan, Masoero, Bowhill, Nief, Woodruff and Burns, (San Francisco).

After the minutes of the last meeting had been read a long discussion took place as to the form of certificate to be given to members of the Association.

It was ultimately decided that the President and Dr. McCollum be appointed a committee to draw up a certificate, same to be signed by the President, Vice-President, Secretary and the Examination Committee.

A letter was then read from Dr. Morrison of Los Angeles, proposing Dr. Rowland of Pasadena as a member, and at the same time expressing regret at his inability to be present.

Dr. H. A. Spencer, San Jose, then read the following paper on "Ergotism."\*

A long discussion followed as to the effect produced by ergot, and also whether smut or some other fungus could not produce some of the same symptoms. Dr. Thomas Bowhill then read a paper on "The Examination of Horses as to Soundness." It was a very careful, voluminous pamphlet, evidently the result of long and deep research into all the best authorities on that subject, and was productive, of course, of long and keen argument.

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\*The publication of the paper had to be postponed on account of an excess of material.

# AMERICAN VETERINARY REVIEW,

SEPTEMBER, 1889.

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## EDITORIAL.

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RE-OPENING OF OUR VETERINARY SCHOOLS.—After vacation the good work begins again—the veterinary practitioner of twenty-five years ago—the veterinary surgeon of to-day—the work of veterinary colleges—their duties in the past—their obligations in the future—the need of strictly *veterinary* education—the motto “constant improvement.” IOWA STATE VETERINARY ASSOCIATION.—The second annual meeting—prospects of a good gathering—papers of interest to be presented. A NEW VETERINARY SCHOOL.—The Maryland University adds a veterinary department—The veterinarians connected with it—DEATH OF DR. E. F. THAYER. ARMY VETERINARIANS.—The efforts of the REVIEW in their behalf—The penal recompense for our labors—another letter on the need of reform—The United States Veterinary Medical Association and its committee—is the chairman so guilty after all—the duties that are imposed upon the Association and on veterinarians—bill to be proposed—its discussion in the REVIEW asked for.

RE-OPENING OF OUR VETERINARY SCHOOLS.—The month of October will soon resume its place upon the calendar, and the return from rural sequestration to their chairs in our medical schools of the members of the various faculties, and the influx of the crowds (?) of actual and expectant matriculants to their benches and class-rooms, will once more remind us of the labor and achievement which are to fill out the winter months, and recruit and strengthen the great veterinary army of the future. Twenty-five years ago, in the United States, the title of veterinarian surgeon was almost completely ignored, and the notion that any necessary special training, or even an ordinarily good school education were indispensable prerequisites for a successful veterinary practice had not been evolved, much less developed. But to-day the veterinary school is

one of the acknowledged and established institutions of the land, and hundreds of intelligent and ambitious young men are choosing a career in the ranks of a scientific fraternity, and the pursuit of a calling which within the term of a generation would have brought them no nobler designation than that of "horse doctor" or, as a somewhat genteeler cognomen, "farrier."

Yet some of our existing schools may already claim a comparatively extended existence, and in fact can number among their teachers men who have grown old in their honorable work. It has been with them a labor of professional love, and it must be with a feeling of profound satisfaction that they are now able to contemplate the fruits of their efforts as they have become manifest at the present time.

But there is something which cannot be overlooked—a consideration of the first importance, which it would be an almost fatal error to ignore, and which should receive to-day the practical attention to which it is entitled, and which it will finally command. It is involved in the important question whether existing schools have enlarged their teaching facilities and means proportionately to the advancing development of the science? There has been an annual increase in their number—more are coming into being and others will from time to time spring up and parade their announcements and promises, but is this the only kind of increase which the profession and the public, and the true interests of science, have a right to expect? Some among our thinking friends have fears in this direction, and have premonitions of danger and trouble ahead: they think that not merely more schools are needed, but more and better, as well as the improvement of the old. The veterinary education of twenty-five years ago will not meet the requirements of the veterinarian student of the present time. Amalgamated faculties are scarcely any longer justifiable. *Veterinary*, and strictly *veterinary* teachings are indispensable, and it must be the chief effort of *veterinary* schools to acquire the power of conferring, in the degree of *veterinary* surgeons, a certification that its holder is "every inch a (veterinarian) king," and no usurping preten-

der, practising under a pseudo warrant, the principal function of which is to secure the concealment of the ignorance and charlatanry of the holder—a possible danger which every means should be employed to prevent.

Newly created faculties of freshly incorporated veterinary colleges must not be estimated merely by their power to influence the accession of large classes of students.

The value of the faculty must be estimated in reference to their ability to impart a sound theoretical and practical education, from a curriculum whose motto shall be "*constant improvement.*"

It should be our grand aim to so train and qualify our students that they may be known as lacking nothing within the broad boundaries of the science which they cultivate and apply, and as being fully capable of overtopping and surpassing, beyond successful competition, the pretentious quack, even when armed with the deceptive and technical parchment which incompetent or designing legislators may sometimes be induced to authorize.

IOWA STATE VETERINARY ASSOCIATION.—We gave notice in our last issue of the second annual meeting of this society, appointed for the 3d and 4th of September. From subsequent particulars and intimations, we feel authorized to promise that the meeting will prove to be an occasion of unusual interest, which will well repay the time and attention which may be devoted to attending the various sessions.

We hope to be favored by the Secretary with a good report of the meeting, and that the various speakers will accept our invitation to the hospitality of the pages of the REVIEW. The publication of the papers will no doubt be interesting to the profession at large. Tait Butler of Davenport is Secretary.

The following is the appointed order of business:

On Tuesday evening, President's address, by President S. Stewart, of Council Bluffs; "Sulphate of Eserine—Its Medicinal Uses in Veterinary Practice," by R. P. Steddom of Oskaloosa; "Diseases of the Heart," by J. Miller of Ottumwa; "Surgery in General, Castration in Particular," by Tait Butler of Davenport; general informal discussion of practical veterinary subjects. On Wednesday evening: "Clinical Observations," by A. B. Morse of Des Moines; "Bone Spavin," by C. A. Cary, Professor of Veterinary Science, South Dakota

Agricultural College; a paper by J. A. Campbell of Des Moines; general discussion; banquet.

A NEW VETERINARY SCHOOL.—Maryland joins her sister States of New York, Pennsylvania, Massachusetts, Illinois, and others, in the veterinarian procession, and her university now includes a school of Veterinary Science. The first announcement has been issued, and the first course of lectures will open on the first day of October. Our friend, Dr. W. H. Wray, is the Dean, and Professor Robert Ward, F.R.C.V.S., President of the Faculty. Our best wishes are tendered to the new school. It has a powerful name at its back to help the enterprise along, but a powerful rival close at her heels in Philadelphia, in old Jefferson.

ARMY VETERINARIANS.—The zeal with which the REVIEW has advocated the interests of our brethren who hold government appointments in the army, and the efforts we have made from time to time to assist them in securing the full measure of their rights and privileges in "the service," among those who are simply their legal equals in station, are facts too well known to the readers of our magazine to call for recapitulation.

We have always claimed for the veterinarians in the army of the United States a recognition worthy of their education and of their calling, as officially appointed scientists, and in fact have even done so at times in terms sufficiently emphatic to incur the resentment of certain official individuals, to a degree so intense that only the old time vengeful challenge to "stop my paper" could satisfy it. But we are conscious that we are laboring in a good cause, and although we may have been thus made to suffer for our faithfulness to our friends, we nevertheless intend to persevere in our advocacy of the just and the right, until we have effected a change, and one which shall not fail to effect a reform of present abuses.

A letter which we print in the present number, from the pen of one of our ablest correspondents, once again makes a representation of the evil of the present army veterinary organization, and urges the profession to bring their combined forces to bear upon the subject, in a new attack upon the existing wrong.

The United States Veterinary Medical Association is specially called upon; and the remarks of the author touching the course of the committee appointed by the association, meet with our full endorsement; although the chairman of that committee may still not be altogether the culpable party. He is not precisely neglectful of his official duties, nor is he wanting in professional interest, but we know that he is burdened with numerous occupations, involving many onerous duties. And it may be further urged in his behalf, that he has made repeated requests to be relieved from his position as a member of that committee, for the very reason of his inability to give his attention more seriously to the work, and to perform the journeys and solicitations which are involved in its action.

The veterinarians of the United States should set to work immediately and concertedly. The paper which we publish suggests among many other points, the arguments that the government is already informed of our needs; officers in the army and officers in the War Department are prepared to listen to our pleadings with a favorable disposition, and there is a better promise of success than has hitherto existed, in an effort to remove an evil which never should have been permitted to take root.

DR. E. F. THAYER.—The news of the decease of Dr. E. F. Thayer of Newton, Mass., reached us, last month, as we were mailing our August issue, and too late for us to give the sad information to our readers, and at too short notice to permit us to honor our old friend with our last duties. Dr. Thayer expired on the 29th of July, after an illness of three weeks, at the age of 78. He had been engaged in the practice of veterinary medicine for many years, but was compelled to abandon the field a few years ago, leaving in the record of his professional life a name which will forever do honor to the cause of veterinary sanitary science, and furnish evidence of the value of the public services which it is in the power of an accomplished veterinarian to render. He was the first and the only veterinarian who knew how to recognize the presence of contagious pleuro-pneumonia in Massachusetts, and it is to

him as a veterinarian that that State may credit its exemption from the presence of that plague.

If this had been the only professional services rendered by Dr. E. F. Thayer to his countrymen, it would be enough to entitle his name to the gratitude of posterity in connection with the history of veterinary medicine in the United States, without enumerating his other claims to a place among the distinguished and useful men of the country. Our sincere condolence and the assurance of our cordial sympathies are tendered to the bereaved family and friends.

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## ORIGINAL ARTICLES.

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### GENERAL LYMPHANGITIS.

An article read before the California State Veterinary Medical Association, December 13, 1888, By DR. J. P. KLENCH, V.S.

In former times, glanders and farcy have been considered by the most prominent lights in veterinary science as of a tuberculous nature, and the miliary deposits in the lungs were admitted to be entirely similar to those of tuberculosis. The microscopists made great efforts to discover some marked difference between the two diseases in the intimate nature of the abscess, its formation and its contents, although well knowing the great difference of the symptoms in both affections. All admitted, however, and the same opinion is prevailing still at the present time, that the specific product of glanders is a small nodule, of the size of a lent, composed of round cells and connective tissues; these noduli degenerate and form cavities or ulcers according to their location. Prof. H. Bouley had such confidence in the metastatic character of those tuberculous deposits in glanders that, whenever called upon to examine a suspicious horse, that showed only a bad nasal discharge and adherent gland, without any visible ulcer, he invariably condemned such horse as affected with the confirmed glanders, when he found one or two miliary tubercles on the membrane under the nasal wing; that, said he, is an evident proof of the existence of miliary tubercles in the lungs.

But since that time veterinary science has made great progress. Bacteriology was unknown in our medicine, and in its infancy in human pathology, and no bacillus was ever thought of being the true element and constitutional principle, the living animal, of the glanders. It is to-day admitted by all authorities that the glanders cannot exist without the presence of this bacillus, which is found only in the glandered deposits like abscesses and ulcers. It is also conceded and proved by inoculation that the bacillus is the only possible element of contagion.

Let us look now for the favorable conditions for the development of the glandered bacillus. It has been proved by statistics that the glanders and farcy acquire an extreme degree of extension in moderate climates, and that extreme cold and very hot weather destroy the vitality in the bacillus. Hence it is possible that the fluids within or without infected stables may provide suitable media for the bacteria to retain their vitality outside of the animal organism. According to Krabbe, there occurred in 10,000 horses in Norway, from 1857 to 1873, six cases of glanders yearly; in Denmark, 85; in Great Britain, 14; in Sweden, 57; in Prussia, 78; in Belgium, 138; in the French Army, 1,130; in the Algerian Army, 1,848, which show that glanders increases in frequency as we go from a northern to a southern climate. (AM. VET. REVIEW, June, 1887). Now, as the climate of California is similar to that of Southern France and Algeria, and as the manner in which the police laws are executed here in California is less strict than in the European countries, we can affirm that the glandered virus finds a suitable place in our State to retain its complete vitality wherever it is produced, like barn floors, barn yards, manure, straw stacks, pools of putrid water and even pastures, and no rough winter will ever come to destroy the same. The glanders and farcy have been reported as causing very great ravages amongst the equine species in almost every county in California, and *thousands* of horses and mules have been destroyed as victims of this contagious disease within a few years. When I consider the great resisting vitality of the glandered bacillus, I am led to believe

that it is impossible for this State to get rid of this contagious element within the next few years, especially as there is no authority existing in this State that has the legal power to enforce proper and complete disinfection of the infected premises, besides burning the body of the diseased animal.

From the above description of the differential symptoms, I form the following conclusions as to the possible glanders:

1. That the mule disease in California is, originally, not the chronic farcy, on account of the complete absence of induration in all the pathological formations—*no hard, adherent gland, no indurated nasal ulcer, no chronic glanders, no hard, indurated cords and ulcers on the skin, no chronic farcy.*

2. That although there exists a very great analogy of symptoms, it cannot be either the acute glanders or farcy, because the mules resist this affection many months, and the horses even longer, while the confirmed acute glanders causes death in about six days without fail. When farcy causes death, the post mortem examination will always show the lesions of acute glanders in the nasal cavity and lungs, as also of suppurative arthritis. On the contrary, I have never discovered any lesion of metastatic or inflammatory origin in the lungs nor in any other viscera of the several mules I have examined after death.

On the other hand, it is an admitted fact that the acute glanders and farcy select in preference animals of a sanguine constitution, and especially the jackass and mule, stallions and well bred horses, which are naturally more excitable than the phlegmatic, cold blooded horse. It has been repeatedly proved that chronic farcy inoculated from a horse to a jackass, never developed the chronic glanders, but always the acute form, and caused death in a few days. Now the mule has evidently inherited a portion of this natural aptitude to contract the acute form in all internal diseases; and, indeed, mules suffering from a chronic internal affection are very, very scarce. It is well known that thousands of mules were affected in this State and lived for several months, some of them even keeping up a good condition for a long time, so that this circum-

stance must discard all idea that the violent poison of acute glanders and farcy exists in this affection.

I will now consider the question of contagion which undoubtedly highly characterizes glanders and farcy. The main objections I find against the supposed contagion are: 1st, the fact that many animals are attacked in a very short time on the same premises, and at different places of the same county. 2d, the outbreak of the disease over the whole body in a violent manner (which is only possible in the acute glanders), seems opposed to the idea that the multiplication of the bacillus requires time and slow progress, as is the case in chronic farcy (which disease is not indicated by the existing symptoms). 3d, That no evidence is known of the existence of a real, living poison. 4th, That the cessation of the disease at every place after the affected animals were destroyed, and when no measures of disinfection were taken, proves that the disease was located in the individual organism. 5th, That no reliable evidence of direct contagion has been reported, but rather the proofs of non-contagion. 6th, The fact that, in the majority of cases, this disease is spontaneously developed without any known cause, while the glanders are considered to be the product of contagion.

If this disease is not the glanders, what then is its real nature? It is very easy to ask this question, but rather difficult to give it a decisive answer. I acknowledge that on examination of the first few cases, I was impressed by the great similiarity of symptoms between this affection and the acute glanders and farcy, but careful examination and repeated observations before and after death created in my mind a doubt as to the real character, which doubt I cannot expel until I am convinced of an adverse opinion by several evident proofs of contagion, and the existence of a glandered bacillus. The idea of chronic farcy and glanders must be rejected, unless we admit the theory that the peculiar climate of California is not adapted to favor the process of induration in the glands and other tissues, or to effect metastatic deposits in the internal organs. This idea, it appears to me, is, however, not admissible, because it is sufficiently demonstrated that tubercu-

losis is as common amongst cattle and hogs here as in other States, and that consumption amongst people is as frequently originated in California as elsewhere. Besides, no difference has been noticed for this climate, either in the symptoms or in the metastatic deposits.

I can affirm most positively to have seen and condemned for having the glanders, several horses with all the capital symptoms of the chronic type, having an indurated gland and miliary tubercles. It is also very important to mention the peculiar circumstance, that this disease was never found to break out on those ranches where only horses are raised and kept, especially when these horses were of good breed ; while it attacked in every case such farms where we find working-horses and mules together, or mules only. I have yet to learn of a well bred horse falling a victim to this affection.

To resume, if we conclude to admit this to be the acute glanders and farcy, (or the sub-acute type), we must accept that the glandered poison has lost its intensity and that its effects remain external and never form any metastatic deposits ; that there is no contagion, but only infection ; and finally, that the disease is spontaneously developed and not the products of contagion.

*Ergo.* The old theories, advocated by the greatest veterinary authorities of all nations, about the nature of glanders, are declared false and without foundation—for California.

I am convinced that the affection is located in the lymphatic system, and consists either in a certain modification of the lymphatic fluid or in an inflammation of the vessels. I always had, and still have to-day, a great doubt as to the inflammatory character of this disease, for I never could notice any great modification in the anatomical structure of the ganglion and vessels, that would be proportioned to the vast extension of the disease over the whole body and for a long time.

I do not believe in the presence of any microbic element in the nourishing fluids, nor in any modification in the chemical or physical elements of the blood, nor in any disturbance in the physiological functions of any organ or system of organs as connected with the primitive origin of this disease, until reliable proofs appear to advance a different opinion.

I must not forget, before closing the diagnosis, to mention the circumstance that frequently local lymphangitis affects the intramaxillary and inguinal ganglion, and that the first one very often terminates into chronic glanders, if proper care is not taken to effect a speedy cure. The lymphangitis of a posterior leg is always of a more inflammatory type; generally it terminates well and remains of a benign character. It also happens very often that accidental wounds or wounds consequent to an operation, are followed by ulcerous lymphangitis on their peripheries; that constitutes local farcy; it is easily cured, but if neglected, is liable to poison the whole system, and degenerate into general farcy.

In support of my considerations about this lymphatic disease, I will relate several cases of my personal experience:

A heavy truck horse of Geo. Blake & Co., Stockton, working every day up to the evening of October 4, 1884, (having been losing flesh for two weeks before) when I found him in great distress, having difficulty to move the hind legs, especially the left one; noticed a hard lump on both crural regions and under the abdomen; various cardeous swellings on tibial region of left leg, covering the external surface only. All these tumors are painful on pressure; complete absence of any tumefied ganglion; visible membranes normal. More lumps appear every day, some very close to one another, on front legs and inside of hind legs; the members of left side are literally covered with buttons, while the right legs have only a few. I counted at the end of the first week about one hundred abscesses; those abscesses that were opened at first are cicatrizing quick, in about two weeks. Horse is moving easier as the abscesses are opened. Fluid evacuated is half coagulated, of an opaque color. The crural muscles are decaying away. Never the least tumefaction of lymphatic glands, nor any nasal discharge. Treatment tonic, stimulant and alteratives; horse has a good appetite. The two legs on the left side that were at first covered with abscesses and swollen, became very clean and sound in about five to six weeks, while the two right limbs affected later a similar change. But cold, rainy weather set in, and the patient falls

into a complete marasmus; died January 28, 1885, after an illness of about four months. Eight days before death came on, I noticed a piece of the skin, of the size of a man's hand, fall off, as by dry gangrene, inside the fetlock of left fore-leg. On post mortem examination I found all viscera sound and clean; only yellow serous infiltration under the skin in those places where swellings existed before death. All organs pale, very little blood in the body. This was certainly not the farcy; the horse was always kept on the same premises, no measures of prevention or disinfection were taken, and never any case of glanders and farcy appeared on any of the other five horses.

In January, 1886, I found at the ranch of John Ellis Lathrop, three mules affected with this mule-lymphangitis, and one horse suffering from chronic nasal gleet. One mule, bleeding from the nose, was taken out of a plow-team of eight mules, with the harnesses on. These four animals were running loose in the corral with forty-eight other mules, feeding in the same manger, and drinking in the same troughs; found blood and mucous discharges on the wagons and fences of the corral: in the three watering troughs I noticed discharged matter floating on the surface and some that went down to the bottom. These four animals were taken to another place and killed three or four weeks later. On opening one of them, I found the lungs perfectly sound, and the nasal membrane all rotten. Never had this farmer, to my knowledge, another animal affected with this disease before or after this time. I will mention that if these animals had been glandered, it would be a surprising wonder that the loss at this ranch was so small and the contagious virus so weak and powerless.

John Wagener, of Atlanta, who had lost twelve mules in 1883-1884, called on me to examine his stock. I found one mule seriously affected, and a buggy-horse which he used to drive daily to Stockton until he was refused admission in all the stables, because he had an old chronic nasal catarrh; these two were condemned as incurable and shot. But in the field I found another horse, working in a team of eight horses,

showing sores on both nostrils, some of which sores were cicatrized; the discharge was mildly abundant, and often mixed with blood; three large hypertrophied glands between the jaws, nasal membrane of rose color. Horse was fat, sleek, in a very good working condition, all other horses and mules sound. This horse was reported two years later to be about in the same condition and working all the time without any danger of contagion to other animals. I never heard that man complain of having lost another horse or mule.

Mr. Heining, of Salida, Stanislaus Co., had one mule taken sick while at work, and in twenty-four hours the nasal passage and larynx were so gravely affected as to cause choking. That mule died in two days. A week later I was called again to his place to attend to the family horse, affected with anhemia, and was astonished to find, separated in another stable, two young fat mules, that had both nostrils covered with sores. Mr. Heining received these mules, as a present, from a neighbor, who having lost several animals from the same complaint, had resolved to kill these two. Mr. Heining, being a man of means and of study, wanted to experiment with these mules. So he treated them in most any imaginable manner; they broke out on the body and legs, but improved in the course of a few months, so well that he put them to work, drove around the country with them and mixed them up with his other stock. One of them happened to be overheated and died. The other has recovered entirely and showed last August, 1888, clean legs, all swellings and tumors of the body had disappeared, only white scars visible on such places where large sores had existed; two intermaxillary glands still hypertrophied; a light, serous, watery discharge from both nostrils, various cicatrices of old sores visible in both nasal cavities. Mule is lively and in good health. That mule is cured and never had the glanders.

Ed. Hall, of Tarlock, works from sixty to seventy head of stock, and lost several years ago about \$2,500 worth of mules within six months. On examining his stock, I found two horses and a mare, with a sucking colt by her side, having a free double discharge of good character and two soft glands

loose; this mare showed the same symptoms at the time the mules were dying, but was not glanderous, as proved not only by the character of her symptoms, but by the soundness of the colt and the other stock. And still the mare and the two horses became affected at the same time and pasture as the dead mules, two years before.

Mr. Murphy of Salida, one year before, lost six mules out of a band of fifty to sixty head, while in pasture, of the same complaint. Never any measures of precaution were taken before or after the disease appeared and disappeared, and no more sick animals were heard of. The history of glanders never will mention a single case where this contagious affection will leave the premises so easily after having taken such a strong, fatal foothold on the same.

Wm. Dale, of Modesto, and three of his neighbors, had each one mule dying in the corral and stable from this affection, and never suffered any further loss, although none of these men ever cleared or disinfected their premises.

From 1885 to 1887 at least one thousand mules died or were killed in Stanislaus Co. as victims of this disease; only a few horses and mares were affected, and some of them are yet suffering from that disease to-day. Only a few ranches were spared. Nearly all these animals were treated by injection, inhalations, steaming, smoking, insufflations, all kinds of patented and non-patented condition powders, iron tincture, arsenic, calomel, copperas, etc., and not one person in the whole county died of glanders or even septicemia. And still in Illinois and other places, cases of glanders appeared in families where one or a few horses only were found affected with chronic glanders. It can therefore be safely admitted that the disease was not very benign or not the glanders at all.

I will now report one more instance in support of the non-contagiousness of this affection. Three farmers near Modesto had turned their working stock in an alfalfa pasture on the west side of the San Joaquin River, where about four hundred head of stock, horses, mules, brood mares and colts, were kept together about four months. About June 1st they

took their animals, one hundred and thirty head in all, home and fed them on grain and hay, to prepare the same for work in the harvest. Hardly three weeks later, each one of these farmers had one mule complaining of this mule disease; that one of David Kerr was all gangrened in the head, and killed after three or four weeks; it formed the subject of the post mortem examination given above. The mule of James Kenealy broke out in a hind leg; I lost sight of him; the third one belonged to W. W. Stone, and received my close attention for one month. This mule was three years old and fat; broke out on legs and body, having, inside of one week, over one hundred abscesses and buttons; both nasal cavities were gangrened, but there never was any œdema in the glottis. This mule was lively, ate well, and had all the time a splendid coat; but gradually the disease progressed, and before the farmer concluded to destroy her I was allowed to experiment on her. I inoculated an old mare in three places, one on the left costal region, and one on each side of the neck, by making a cut about two inches long and pouring the fluid extracted from a newly opened abscess of the mule in the pocket of these cuts, and closed them up with one stitch. Then I coated a small sponge over with the nasal discharge of the same mule by holding and turning the sponge around in the nostrils, and introduced this same sponge in both nostrils of the mare, for a few minutes. At the same time, the mare was tied up near the mule, eating out of the same manger and drinking from the same pail. Fourteen days later Mr. Stone resolved to kill his mule, and my mare was taken out and destroyed. The three wounds where I had introduced the matter taken from the mule, were giving a good deal of suppuration of a very healthy character and no swelling, nor cord, nor tumor, could be detected either around the three inoculated wounds nor on any part of the body. The nasal cavities were clear, and no ganglion swollen. The mare was declared sound.

No sick animal could be found on the premises of either one of these three farmers, nor in the pasture. In all certainty these mules were not glandered, unless it be the acute type;

nor was there any contagious virus existing at the home places nor in the pasture. What was the real cause of this disease here? The animals had pure air, good water, good nourishment and no work; and good, clear weather, without frost or rain, existed at the time.

To prove the change of original lymphangitis into farcy and glanders, I will relate the following two cases:

About four or five years ago a fast roadster, Lightfoot, kept in a very good livery stable in Stockton, was found suddenly, in the morning, bleeding from the right nostril. The right intermaxillary gland was very large and painful, sending a cord toward the right nostril, lip on same side very much swollen; inside of right nostril a sore three inches long by half an inch wide. This was a lymphangitis of a benign character. In a few weeks the horse was recovered, but several months later I condemned him for confirmed chronic glanders, having a hard adherent gland, a bad nasal discharge and two indurated ulcers, all on the *left* side, while the primitive lymphangitis was on the *right* side.

About June, 1888, I examined at the home of Mr. Hamilton, near Salida, a mare sick for several months. I noticed a splendid lustrous coat, the appetite very good, the crural muscles of left hind leg all decayed, same leg swollen below; from twenty to twenty-five sores on the inside surface of the same leg; those opening on the lymphatic vessels discharged a yellow fluid half coagulated; some of them recently opened gave exit to healthy, limpid lymph; a few of them evacuating a white, cheesy fluid. No swollen glands nor nasal discharge, nor farcy lesions at any other place. Diagnosis: lymphangitis of the inguinal and crural ganglions, but of mixed character. Inside of two weeks the mare showed a great improvement, the most of the sores healed, a few new ones appeared on the mammary gland, the swelling of the leg went down, mare rests better and moves easier. But suddenly a cold north wind set in, causing a chill through the whole system, and twenty-four hours later the hair was staring, coat dry, adherent, appetite bad, expression dull, animal weaker, the affected leg swollen considerably, having the appearance of farcy in-

filtration; the aspect of the sores was bad, fluid discharged is white, looks like matter. Mare condemned as affected with farcy and destroyed.

From all the above considerations, theoretical and practical, I am induced to draw the following conclusions:

1st. That this disease affects the lymphatic system, locally or generally.

2d. That it is non-contagious at the beginning, although it might be infectious; and that where several animals on the same premises are affected, the disease is caused by similar mysterious influences of locality, weather and climate, on all the animals in a like manner, without the existence of a contagious principle.

3d. That, with the progress of the disease, the animal organism might undergo such modifications as to transform the primitive lymphangitis into a farcinous lymphangitis, and then develop glanders and farcy.

4th. That the disease resists all kinds of treatment and is fatal to all mules, while the majority of horses will partially recover from its effects.

5th. That the presence of a horse affected with chronic glanders in a band of these diseased animals, cannot lead to the conclusion that the disease is of a glandered nature in every case, no matter how suspicious the appearances may be.

*Prognostic.*—Very serious and fatal. Death occurs almost in every case, if the animal is not destroyed by the hands of its owner. Those mules which are affected only on the body and legs, can live six months and a year if properly cared for, although losing strength on account of the great quantity of lymph which is detracted from its natural course and is a direct loss to the general nutrition. When the same disease breaks out in the nasal cavity and larynx, it causes a great difficulty in the act of respiration, and thereby greatly impedes the complete arterization of the blood, besides indirectly impairing the health of the animal, as the inspired air, when going over the gangrened sores, absorbs a diseased, decomposed material, that is introduced through the pulmonary

capillaries into the blood and constitutes a permanent danger for blood poisoning.

In horses affected in the same manner, the disease remains stationary and benign for a long time, if they are in a sufficiently good condition; and many will recover except so far as the lesions in the nasal cavity are concerned, which will constitute a permanent light discharge, render the horse unsound and constantly suspicious. But with horses there is always great danger of this disease turning into glanders, whenever a cold chill, or a disturbance in the digestion, or a weakness in the constitution through heavy labor, insufficient feeding or exposure to inclement weather, or the consecutive effects of any acute fever, cause a change in the general nutrition and in the functions of the absorbing vessels and the whole lymphatic system. Mules might likewise become glandered from similar changes, but the disease will generally affect a mixed or bastard type, or an acute character.

*Treatment.*—It is my earnest and honest conviction that this disease is incurable in mules, and therefore I would propose, in every case, to destroy any and all mules thus affected, for the sake of humanity as well as a precautionary measure against possible glanders and farcy.

If horses are in good condition, they might be submitted to local and general treatment, receive proper care and nursing, pure air and substantial food. Above all they must be kept separated from the other stock. The healthy animals ought to be removed to another locality on high and dry lands if possible. This measure will almost every time check the further outbreak of the affection.

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## THE VETERINARY SURGEON IN THE U. S. ARMY.

BY GERALD E. GRIFFIN, D.V.S.

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As my article on the above subject in the December number of the REVIEW has been productive of some good to the veterinary service in the army, (as may be seen by referring to General Orders No. 19, Headquarters of the Army, dated Adjutant General's Office, Washington, February 20, 1889,

from which I will give a few extracts), I am encouraged by this partial success to renew my efforts in this direction and place the matter once more before the profession, with a hope that I may be assisted in these efforts by some of the veterinarians now in the army. In all probability it will be asked why I am so much interested in elevating the standard of the army veterinarian. To this I would reply that the only interest I have in the matter is to see the veterinary profession occupying that position which is its right to fill in the military service of this country. I am a military man by instinct, and I may add, education, and as such respect the traditions and customs that govern the military service; but still, being a member of the veterinary profession, I cannot stand passively by and see the members of that profession who have entered the military service of the United States as veterinarians reduced to the category of "horse doctors," when their training, study and education calls for something more.

The day of the "horse doctor" is rapidly waning in civil life, and even the army regulations call for men of education and ability to fill the position of veterinarian, yet it denies to them the position that is theirs by right and places them on the same level as the non-commissioned staff. My object in writing these articles is to obtain for the army veterinarian proper recognition at the hands of the Government, to arouse the members of the profession in the United States from their lethargy in order that they may enable me, by their influence, to introduce and pass a bill in Congress, giving the army veterinarian the position that his education demands, and providing for *all* the veterinary surgeons who are now serving with the army. Before leaving the subject of legislation I would remark that it was with feelings of regret that I read a certain portion of the report of the United States Veterinary Medical Association, (May REVIEW) in which the Chairman, Dr. Liautard, reported the lack of success of the Committee on Army Legislation. Of course there was lack of success where I presume the committee did not exactly know the wants of the members serving in the army, and when in all probability there was only a half-hearted interest taken in the matter by

the committee itself. What is wanted is energy in this matter, vigorous energy, perseverance and tenacity, together with encouragement and assistance from the members of the profession generally.

I will here give a few extracts from General Orders No. 19, Headquarters of the Army, dated Washington, February 20, 1889:

"No. 289           \*           \*           \*           \*           \*           \*

The veterinary surgeon shall instruct the company farriers in the proper care of the horse. In this he will give especial importance to the anatomy and pathology of the foot, showing the nature and uses of all its parts; illustrating the subject by dissections and specimens. He shall also teach the principles and practice of horseshoeing.

For the purpose of disseminating this information, he will make such visits of instruction to companies of the regiment not stationed at headquarters as may be deemed necessary by the regimental commander."

This is as it should be, and is a move in the right direction, but the veterinarian in our army possesses no rank, and his suggestions on horseshoeing to the troop horseshoer would be received in contemptuous silence by that individual, as no soldier (according to army regulations) shall receive orders from a civilian.

"No. 292½       \*           \*           \*           \*           \*           \*

If four or more companies of cavalry are stationed at a regimental headquarters, a suitable building may be set apart as a veterinary hospital, in which the more serious medical and surgical cases will be treated by the veterinary surgeon under the direction and supervision of the regimental commander."

The establishing of an hospital is an absolute necessity and every military post should have one, which should be erected from plans and specifications drawn up by a practical veterinarian; and should not be (as this order evidently intended it should) composed of some old ramshackle, tumbled down log house or mud building that has served in every capacity from Adjutant's office to Quartermaster's oil house;

for, allow me to remark, that it is a most difficult task to secure any building at all for extra use in a military post. "The more serious medical and surgical cases will be treated by the veterinary surgeon under the *direction* and *supervision* of the *regimental commander*."

This is too much! This is equivalent to a direct insult to those men who now fill the positions of veterinarians in the United States army, and who have devoted their brains, time and money to acquire a special training as veterinarians. This is pure thick-headedness on the part of the individual who fathered this part of the order, and shows a shortsightedness and shallowness that is remarkable when it is remembered that the order originated at the headquarters of the army of the United States. Imagine, ye members of human medicine, one of your number treating a case of pneumonia or amputating a limb under "the *direction* and *supervision* of the *regimental commander*." The idea is ridiculous. What does the average regimental commander know about the anatomy or diseases of the horse? Nothing! absolutely nothing! He may have a vague idea that a horse somehow has "the lung fever" or that he is liable to have the "staggers;" he knows that a horse has four legs and that his "cords" are sometimes strained, but beyond ideas of this vague nature he has none; he may be able to sit in his saddle and command his regiment, battalion or squadron, as the case may be, but to superintend and direct the professional duties of the veterinarian in the hospital and operating room is absurd; he might as well be ordered to "supervise and direct" the Post Surgeon in his professional duties in *his* hospital and operating room.

No. 290           \*           \*           \*           \*           \*           \*

"It shall be the duty of the veterinary surgeon to visit daily or more frequently if necessary, all sick or injured animals of his regiment and to recommend to the officer responsible for them such treatment as he may deem proper. To this end he shall have access to the stables at all times, and his suggestions as to care and treatment of public animals will be received with consideration. He shall also, under the

direction of the regimental commander, attend the public animals at his station, and, upon request, such authorized private horses of mounted officers as may stand in need of medical or surgical treatment."

This is to the point certainly, but the veterinarian should have the sole charge and management of all sick animals without "*suggestions*" to or from any individuals.

No. 291.       \*       \*       \*       \*       \*       \*

"Veterinary surgeons and farriers should be encouraged to make collections of specimens, obtained from post mortem examinations, illustrating the anatomy of the horse, in order to popularize and disseminate in the army a knowledge of this subject."

Good idea! but where are these specimens to be kept? Kicked around each troop guard house, stowed away in the forage room of each cavalry stable or dumped into some old packing box in the quarters of the veterinarian, who is so often pushed for the necessary house-room that he is himself forced to build on additions to his residence so that he may not be compelled to sleep, cook and eat in the one apartment?

It is all nonsense and waste of good time and material to issue such orders as these until there is first something done for the veterinarian himself. His position must be improved in order that his opinions and actions shall receive that respect both from enlisted men and officers that it is his right to expect.

As I have before remarked, I am by instinct and education a military man, and feel that I would be happier and more content in the military service than in civil life, nevertheless I have refused two appointments as army veterinarian, for the reason that I could not criticise the orders affecting the veterinarian issued from time to time by the War Department, as it would be directly opposed to army regulations, good order and military discipline, and I am too much of a soldier to disobey any order issued by my superior officer; then again I could not so well advocate the cause of the army veterinarian from the army itself, as I would be looked upon as a malcontent and grumbler; but out in civil life practicing

my profession I can without restraint place everything in its true light before my brother members of the profession and ask their encouragement and advice on a subject of paramount importance to every veterinarian in the United States.

What is required is an organized veterinary corps in the army which shall receive the pay and rank of the members of the Medical Department of like grade; that it shall be conducted on the same principles as the Medical Corps, and that the list of drugs now allowed by the War Department for the treatment of sick animals be extended; that a competent veterinarian of recognized ability be placed at the head of this corps—such men as Drs. Salmon, Huidekoper, Coates, Stalker, Gill, and several others that I could name, would fill the position with credit—and that provision be made for those gentlemen now in the army who, though non-graduates, still have filled the position of veterinary surgeon with ability for years. In order that this or any part of it may be accomplished, it is necessary that every veterinarian in the United States, whether in the army or out of it, lend his aid and support to the project. A properly framed bill must be introduced in Congress, which your influence with your several Congressmen and Senators will secure the adoption of. I have such a bill in my possession, which I will be glad to submit through the columns of the REVIEW for your comment and criticism, if your views on the subject are favorable. It will certainly take considerable cash indirectly to carry the bill through, but a dollar or two contributed by each individual veterinarian in the United States would be more than sufficient for all purposes. I do not wish to handle this money myself. I would ask the editor of the REVIEW to take charge of the funds, or better still, the Committee of the United States Veterinary Medical Association on Army Legislation, and a strict account rendered of all moneys expended in the transaction. I am determined that this bill shall be introduced this winter, and that with or without your assistance. I shall make at least one effort to elevate the veterinary profession in this instance, even if the chances of success are against me. I respectfully invite your remarks and advice on

the subject by letter, and I need not say that your words of encouragement will be appreciated; believe me there are no selfish motives on my part in undertaking this task; my sole object is to better the position of the army veterinarian and thereby elevate the standard of the profession generally.

I take this opportunity of publicly thanking Drs. Thompson, Ind.; Burnett, Ohio; O'Connor, Mass.; Tempny, Nebraska; McDonald, Wyoming; Jarman, Maryland; Buckner, Ind.; Bland, Col.; Hopkins, Ind. Ter.; Schwartzkopf, Minn.; Morrison, N. Y., and Graham, Mo., for their voluntary offers of substantial aid, advice and influence in this undertaking; their words of encouragement and cheer have given me renewed hope and have nerved me to continue the effort to the very end.

I ask all of you who are interested in this matter (and which of you is not) to drop me a few lines, giving unreservedly any advice or opinions you have on the subject; they will be gratefully received and carefully studied. I especially appeal to those serving in the army, who thoroughly understand the situation of affairs there and know under what difficulties the army veterinarian labors, to give me their advice in the premises; write me at once—civil and military—so that when the proposed bill appears for your criticism in the columns of the REVIEW it may meet with the unanimous approval of all. I ask all veterinarians to use their influence with their Congressmen and Senators in favor of the bill; be energetic about it, see them, tell them what is wanted—it is not a political scheme—and if possible secure a promise of their support. It is only by untiring efforts on our part that anything can be done to raise our beloved profession to her proper station—second to none. Let us all make one grand effort in this particular instance, and there is no doubt but it will be crowned with success.

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### NOTICE.

The regular annual meeting of the United States Veterinary Medical Association will be held at 153 Pierrepont St., Brooklyn, N. Y., on September 17th.

## SINGULAR AND UNACCOUNTABLE EXPERIENCES IN FRANCE,\*

SAID TO BE IN CONNECTION WITH SWINE-PLAGUE.

BY M. GALTIER. Reported and criticised by F. S. BILLINGS.)

*PATHOLOGICAL PHYSIOLOGY.—Determination of the Animal Species, Disposed to contract, by Spontaneous Contagion or Inoculation, Infectious Pneumo-Enteritis, Considered to the Present Time as a Disease Characteristic of Swine.*

Ordered by the Honorable Minister of Agriculture to go and study in the Basses-Alpes an epizootic which prevailed in the sheep, I had as early as the 12th and 13th of last January recognized that I had to deal with pneumo-enteritis, which had been transmitted from the hog to animals of the ovine species. The malady had been brought to three estates by two young hogs recently purchased and which were taken sick soon after their arrival. The sheep of the three estates became infected by living promiscuously with the hogs, and numerous cases of death were produced. The flocks on two other estates had become contaminated, either by contact which they had in the pasture with those that the malady was decimating, or by frequenting the place where the cadaver of a pig dead of pneumo-enteritis had been dragged and buried. Only one hog out of seven that had been sick had died, the others had recovered or were on the way to recovery.

Fifty-five sheep had already died at the time of my mission. There still remained a few that coughed. One was killed and presented lesions which confirmed me in the idea I had expressed, of the transmission of pneumo-enteritis from the hog to sheep. Preparations and cultures made from the products of these lesions gave new confirmation to my diagnosis, and in a first report to the Honorable Minister, I was very strongly of the opinion of the existence of pneumo-enteritis among the sheep. At the same time I called attention to the fact that the affection was much more severe

\* Comptes Rendus. Tome cviii, No. 12, 1889, p. 626.

among the animals of the ovine than among those of the porcine species.

In a second report which I recently addressed to the administration, I gave an account of experiences that unquestionably establish the scientific exactness of my first conclusions.

Cultures made in the Basses-Alpes from the lesions in sheep, and cultures taken from these, induced pneumo-enteritis in guinea-pigs and rabbits. The virus has been cultivated from guinea-pig to guinea-pig, and then returned to the hog and sheep. Two young pigs inoculated—one with the culture derived from that which had been made in the Basses-Alpes, the other with blood from a guinea-pig killed by a culture—had the symptoms of pneumo-enteritis; they coughed, discharged at the nose, had fever, loss of appetite, chills, colic, red spots on the body, etc. Both survived and are on the way to recovery. On March 1, having found at the abattoir in Lyon, a pig that presented the lesions of pneumo-enteritis in process of healing, I used the bronchic ganglions from which to make preparations, cultures, and inoculations with the view to compare the results with those given by the experiences obtained with the cultures from the Basses-Alpes. In both cases the preparations and cultures showed the same bacterium; the inoculations gave the same results, the same symptoms, the same lesions, the same malady, in a word, in guinea-pigs, rabbits, hens, pigeons, dogs, sheep and goats. The two viruses, inoculated for comparison in several series of the animals just enumerated, caused them to perish of the same affection. Besides a number of guinea-pigs, rabbits, hens, and pigeons, eight sheep, four goats, and four dogs were subjected to the action of the two viruses. All these animals succumbed, presenting the symptoms of pneumo-enteritis. All showed in their blood and their organs the same bacteria. The sheep and the goats presented the symptoms that had been observed in the flocks at the Basses-Alpes: redness in the regions of delicate skin, signs of pulmonary disease and enteritis, swelling, etc., were observed among these animals. The lesions were particularly remarkable for their constancy,

generalization, and by their dominant characteristic exudation. All the inoculated died rapidly, like those in the Basses-Alpes, all present among other alterations a violent congestion of the internal surface of the skin, with darker spots in certain regions, a no-less active congestion in the ganglionic system, an exudative inflammation of the chest and pleura, with effusion of liquid in the peritoneal and pleural cavities, and with formation of pseudo-membranes, lesions of enteritis and fibrinous broncho-pneumonia. The dogs presented lesions of the same order, especially enteritis and pleuro-pneumonia.

I very recently received from the Loir lesions coming from a young pig, and with this third source of virus I have obtained the same results as with the two preceding. I transmitted the disease to guinea-pigs, rabbits, sheep and goats.

I am at this moment making attempts to transmit the disease to bovines and to solipeds, and if I may judge of them by facts of observation that I have already gathered, it is permitted to believe that they will end in positive results. I also occupied myself in trying to learn if certain affections that break out at certain times and in certain places among sheep, goats and cattle, are not connected with pneumo-enteritis. I have especially in view, in these investigations, a disease among goats that has been described under the name of "*bon-frida*," that has at times been regarded as contagious peri-pneumonia, and which has caused considerable losses in certain flocks. I have also in view a malady of the bovine species which, by the pulmonary lesions which it shows, much resembles pneumo-enteritis. I have besides on the same farm observed the disease of swine and that of bovine animals.

To sum up, pneumo-enteritis, aimed at by the decree of July 28, 1888, to the sanitary police, as a disease that should be special to the porcine species, is transmissible by inoculation or direct or indirect contact not only to small animals such as guinea-pigs, rabbits, barn-yard fowls, but also to dogs, sheep, goats, and very likely to animals of the bovine species. It is much more severe among sheep and goats than among hogs. It is then absolutely indicated to prevent all contact between sick hogs and other animals on farms where this

affection breaks out. It is finally urgent to extend to the other aforesaid species the measures applicable to the porcine species and modify accordingly the decree of July 28.

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One scarcely knows exactly how to comment upon the above experiments. If they show relation to a swine-plague they certainly do not conform to the American swine plague, which is not necessarily a pneumonia, nor can it be absolutely termed an enteritis, if under the latter term we mean a disease of an ulcerative or neoplastic type, as both will fail in a very great number of cases. Experimental results in several animals, such as rabbits, guinea pigs and mice, have no essential value to me, as it is very seldom that any pulmonary lesions follow inoculations with virulent cultures of the swine plague organisms in these animals, the real disease, a septicoemia without complications, usually following. I have made a few inoculations in puppies, but weaned ones,—but with no ill effects whatever. As to sheep, there have been hundreds of practical experiences in this country, where large flocks of sheep have been yarded with diseased swine without any evil result, and as I write, there is a gentleman in my room who, purposely, has turned his sheep in among diseased swine for several hours each day in order to have them clean up a portion of the corn left by the swine, which of necessity must have been more or less polluted by the hogs. He says, “no evil results ever followed it.” The same is true of cattle, for hogs are purposely kept to follow after grass-fed cattle, and while every hog may die of the swine-plague, there has never been a case of the cattle becoming ill. With the facts staring us in the face, and they have all the value of exact experimentation, we must conclude that our French confrere has been misled, and while he may have had to do with a pneumo-enteritis, that it was a disease entirely distinct from the swine plague. It may be well also to call attention to the fact that while our English friends look upon the swine plague as “pneumo-enteritis,” that also from these we have no reports of either cattle or sheep having been attacked, a fact that would scarcely have escaped the attention of such men as

Walley had it ever occurred. In my forthcoming report, as also in the REVIEW, will be published an account of a new cattle disease, which is a pneumo-enteritis as much as swine plague is, and which may also attack other herbivora, but will not affect hogs as has been demonstrated by experience and experiment. This indicates that we have not got to the bottom of this class of diseases, as also the absolute folly of depending upon inoculations of small animals for diagnostic purposes in this class of diseases, as well as the microscopic appearances of their germs, for no man could absolutely distinguish between the germ of swine plague and the corn-stalk disease in cattle, (the disease alluded to) in that way. It looks far more as if the disease our French colleague had been studying was the much more widely extended "wild-seuche," which may be also a "pneumo-enteritis," than the swine plague, and which seems capable of complicating a much greater variety of animals than the swine plague, though the germs are much alike.

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## CAN GLANDERS BE PREVENTED BY INOCULATION?

BY FRANK S. BILLINGS, Director of the Patho-Biological Laboratory of the State University of Nebraska.

Living in a State with a "Live Stock Commission" which has been deservedly termed "the Glanders Trust" and where during the past two years a bonus has been paid for horses diseased with this equine pest in the form of remuneration for the most pregnant varieties, while the occult forms have been untouched and left to keep up the supply of diseased horses in order that the "Trust" may live, it is but natural that this question should have often entered my mind: Can glanders be prevented by inoculation? When we carefully look over the evidence, that is the literature which this disease offers, it would seem as if everything is so manifestly contradictory to such a conclusion that it would be a waste of time to consider it for a moment.

The cases of reported recovery are so seldom and the evidence so questionable, when taken into consideration with

the possibility of error in diagnosis, that the probability of such a procedure being practicable seems at first impossible. While I personally know of three cases in which all external symptoms, with the exception of the cicatrices in the septum nasi, disappeared, and in which the three horses all did good work and apparently thrived as well as any horse could be expected to, still, though looked upon as "cured" cases, the fact that in each case the horse in question was the cause of the extension of glanders to those stabled with, or worked with it, and the fact that chronic pulmonary and other organic lesions were present on necroscopical examination, sufficiently demonstrates that they were anything but "cured" cases of glanders. In fact, I think it can be safely asserted that recovery from what we know as constitutional glanders does not warrant any such conclusion.

The next question is, does local glanders, "farcy," offer any better evidence in the desired direction? That "farcy" is at times curable, or perhaps, better, healable, seems to be a matter beyond question as well as that in such cases constitutional glanders does not follow. I am perfectly aware that here too, we are treading upon a much disputed territory, but, on the other hand, the very evidence that we desire is not to be had, for, so far as known to me, there have been no exact experiments made of exposure of such "cured" farcy cases to infection that would necessarily result in constitutional glanders of an acute and destructive character.

The unknown, but really immense loss, which this country annually suffers from glanders, as well as the considerable number of cases in human beings, some of which do not terminate fatally by the way, surely indicate that this question of preventive inoculation is worthy of the most extensive and rigid experimentation. If acute, constitutional glanders is preventable by inoculation it must be by the production of a mild and healable cutaneous form. Can such be induced? Practical experience makes it probable. Experiment must conclusively demonstrate the fact pro or con.

With regard to the prevention of endogenous or contagious diseases by inoculation I am strongly of the opinion,

which is supported by all known evidence, that it is not to be done by the method of artificially mitigated cultures of their specific germs, as is the case in exogenous diseases such as rouget-rothlauf of swine, hen cholera, black leg, anthrax and the swine plague, the southern cattle plague (Texas fever) and typhus and yellow fever in man and such strictly septicæmic diseases, but rather by following the precedent of variola and its prevention by vaccina, or in other words, by the continual transmission of the disease for generations through the organism of some moderately susceptible animal, in which it does not prove fatal, until it arrives at a given constancy of mitigated virulence which, while still capable of producing a protecting disease in the species of animals in which such a disease occurs, under natural conditions, does not produce it in such a form as to render such inoculated animals dangerous to others of the same species. This is exactly what occurs in vaccination. In this regard I have long thought that such results might possibly be acquired by the successive production of cutaneous glanders in dogs.

This hypothesis has been engaging my thought for a long time, and I was not only pleased, but somewhat surprised, to see that introductory steps in this direction had been entered upon by one of my French confreres, whose communication is just published in the "Comptes Rendus," Tome c. VIII, No. 10, 1889, p. 530, of which is offered a very free translation.

Mr. Strauss says: "Glanders is considered to be a virulent malady for which there exists no immunity. The experiments which I have made do not agree with such a conclusion. We know that the dog possesses but a feeble degree of receptivity to glanders infection, for when by scarification or incision, we insert glanders material under, or into, the cutis of this animal, a local ulceration follows characterized by spontaneous cicatrization at the end of a month or six weeks; it is not common to see the disseminated or constitutional lesions of the disease, with death, follow such a procedure in the dog."

In my experiments I have adopted another course, viz: I have directly introduced pure cultures of the germ of glan-

ders into the circulation by injecting the same into the saphena vein. When a considerable quantity was injected (1 to 2 centimeters) the animal presented the phenomena of intense fever and great constitutional disturbances at the end of seven days; the skin was marked by numerous nodules in its substance, which eventually ulcerated, yielding a sero-sanguinolent secretion conformable to that generally seen in these lesions. Death resulted in from three to six days. Macroscopical examination revealed the presence of fine glanders granulations in the liver and spleen, but more rarely and less extensively in the lungs. Cover glass preparations of the cutaneous secretion and blood of the heart revealed the presence of glanders bacilli. These experiments with large quantities of pure bouillon cultures demonstrated the fact that a fatal form of the disease could be produced thereby in the dog.

If, on the contrary, one injects into the same vein a smaller quantity of the same culture, the results are of a much less grave character, the cutaneous eruption is not so acute or severe and the animal recovers. This is a new and striking example of the fact shown by Chauveau of the proportionality which exists in certain diseases between the dose of the virus and the results following on the same.

With dogs thus treated and on the lapse of some weeks or months after recovery, extremely strong doses of a very virulent culture were again injected into the vein in question, doses that would have been invariably fatal in an animal (dog) not so prepared. Neither local nor general phenomena were observed to follow in most of these experiments, though a mild febrile condition and a slight cutaneous eruption was occasionally seen. These experiments demonstrate that artificial immunity can be induced in dogs in the manner indicated."

So much for our author.

Certainly we have here strongly conclusive experimental testimony in favor of my hypothesis. The next question is to decide whether by carrying the first induced cutaneous affection to healthy dogs in serial succession we can induce a

glanders eruption in which the bacilli will finally acquire a constancy of mitigated virulence, or whether such a procedure is followed by entire loss of virulence. Both of these questions can be tested upon male guinea pigs, in which we have specific lesions. If such a procedure in dogs causes entire loss of virulence on the part of the bacilli, then we must take them from the dog at an intermediate period, and by using the guinea pig endeavor to find whether this standard of virulence is retained in that animal, or whether it augments by being passed through many. In the latter case we must have recourse to another animal, possibly the rabbit. If such a standard of mild virulence can be obtained then we must have recourse to the horse, and after having produced a mild cutaneous disease which heals of itself, and is non-contagious, then we must expose such animals to general infection, and if no evil results follow the problem is solved. While this question is open to a much more detailed discussion, it would seem that enough has been said to introduce its importance to our experiment stations.

Lincoln, Neb., April 8, 1889.

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## ERGOTISM.

BY DR. H. A. SPENCER.

A Paper read before the California State Veterinary Medical Association.

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*Mr. President and Gentlemen :*

Those members who were present at the last meeting will undoubtedly remember that I made a few remarks bearing upon the disease known as "Ergotism," Our President evidently deemed the subject of interest and requested that I introduce it at our next meeting, and while it affords me great pleasure to comply with his request, I sincerely wish it had fallen into abler hands. Any failure on my part I trust you will attribute rather to the lack of ability than to want of inclination, or opportunity to acquire the information.

The term "Ergotism" has been applied to the poisonous effects of ergot of rye.

History tells us that this affection made its appearance at a very early date, and from time to time it has manifested itself in epidemics since the days of Claudius Galenus, commonly called Galen, and who was celebrated as a physician in Rome about A. D. 160.

In A. D. 992 there was a widespread and deadly epidemic in France. Two years later it again appeared in the same territory, and in 1041 it was prevalent in England, France and Germany. Then forty-eight years later, in 1089, it was rife throughout the Continent, and especially was it prevalent in the western parts of Lorraine, where many persons (so says an old author), became putrid in consequence of their inward parts being consumed by St. Anthony's fire. Their limbs were rotten and became black, like coal. They either perished miserably, or, deprived of their putrid hands and feet, were reserved for a miserable life. Moreover, many cripples were afflicted with contraction of the sinews (*nervorum contractio*.) After an absence of ten years, and covering a period of more than a century, it was more or less prevalent in France and Spain. In 1598, in Germany, and at numerous dates from 1694 till 1754 it appeared in various countries in Europe.

In America reference is made to it about 1820; and in March, 1884, you may remember there was an outbreak of it, among cattle, near Neosho Falls, Kansas, which created not a little excitement, in its having been at first pronounced foot and mouth disease, by a number of veterinarians, and confidence was not re-established until extended investigations were made by the Bureau of Animal Industry, through Dr. Salmon, its Veterinarian-in-Chief.

#### NATURE AND ACTION OF ERGOT.

The substance known as ergot is one of the stages in the growth and maturity of a fungus, which has been named *Claviceps purpurea*, and the term ergot was applied to it by the French from its fancied resemblance to the spur of a cock. The first botanical writer who notices ergot is Lonicerus. Chambers says it begins to show itself on the germen of

grasses when it is young. Different parts of the flower assume a mildewed appearance, and become covered with a white coating composed of a multitude of spore like bodies mixed with delicate cobweb-like filaments; a sweet fluid, at first limpid, afterwards viscid and yellowish, is exuded; the anthers and stigmas are cemented together; the ovule swells till it far exceeds the size of the natural seed, bursts its integuments, is elongated, and is often curved, sometimes carrying on its apex a cap formed of the stigmas and anthers agglutinated, and assumes a grey, brown, purple, violet and finally a black color, as the viscid exudation dries and hardens. The structure differs very much from that of the properly developed seed. The qualities are not less different; nearly one-half of the whole substance consists of *fungin*; and the cells contain, instead of starch globules, a fixed oil (oil of ergot.) Ergot appears to have been first discovered on rye, in which it is very conspicuous for the large size it attains, though it frequently makes its appearance on other cereals, particularly on barley, wheat and maize. It was supposed to be a disease occasioned by wet seasons or other climatic causes, but it is now fully determined to be due to the presence of the *mycelium* of a fungus, the spores of which may be carried to the flower through the juices of the plant, for there is reason to believe that ergot in a field of grain may be produced by infected seed; and this is undoubtedly the reason that the fields of which I shall presently speak are affected year after year.

#### THE ACTION OF ERGOT ON THE ANIMAL BODY.

According to Diez, the principal effects of poisonous doses of ergot are in the lower animals profuse salivation, vomiting, dilation of the pupils, hurried breathing, frequent pulse, cries, trembling, staggering, paraplegia, sometimes diarrhœa, sometimes constipation, thirst, convulsions and death.

Mr. S. A. Wright, in a series of experiments (*Edinburgh Medical and Surgical Journal*) noted when the medicine was given by the mouth symptoms similar to those just spoken of, the paralysis was much more marked than the spasms. Late

in the poisoning the heart's action became irregular and intermittent, and the pulsations, which had been rapid, grew slow and feeble. In some cases special senses seemed to be destroyed, and coldness of the surface was a marked symptom.

Fleming, in his *Manual of Veterinary Science and Police*, says: "The ergot of rye, wheat, etc., has given rise to extensive disease in man, animals and birds, marked by convulsions, paralysis, dry gangrene of the limbs, loss of hair and horn, and other strange phenomena."

The above summary of the general symptoms caused by poisonous doses of ergot show that the phenomena are mainly paralytic in their nature, and, on the whole, it is probable that the chief action of the drug is upon the nerve centers. Now, Mr. President and gentlemen, as it would occupy too much of your valuable time for me to give you a description of the many experiments and observations that have been made with this drug, both in this and other countries, I will proceed to give you a concise report of the disease as brought under my notice in Santa Clara County, this State.

The animals that I have been consulted about had been fed on hay grown on what is known as the Bascom ranch, situated near the town of Santa Clara. Said ranch is on rather high ground, the soil being of that rich black character known in this country as adobe. It is extremely productive, and in no way distinctive from adjacent places, where a superior quality of hay has been produced annually for more than a quarter of a century, and the use of which has never proved deleterious to horses, cattle, sheep or hogs; but when forced to eat the hay grown on the ranch in question the loss of hoofs, horns, manes and tails is by no means an unusual occurrence—horses and even cows exhibiting all the symptoms of acute laminitis and shedding, as I before stated, their hoofs or horns, as the case may be.

The following symptoms are as exhibited by the animals that came under my observation: Tenderness and heat in the feet; swelling at the coronet; great disinclination to move; temperature considerably elevated for the first few days, but gradually subsiding; secretions normal; appetite voracious. At the expiration of a week or ten days the lameness some-

what subsides and remains so until immediately before casting the hoof, when the animal can scarcely be induced to move. However, as soon as the old horn is cast they rapidly regain their wonted vigor. In milch cows the secretion of milk is usually suspended.

There is undoubtedly a great deal of difference in these symptoms compared with those observed by Prof. Salmon during the outbreak in Kansas; but we must not forget that the disease manifested itself there at a time when the weather was very cold, and I think that cold has a tendency to aggravate the symptoms. Further, we must remember that insufficient doses or a poor quality of the agent in question would modify the symptoms very much.

The treatment I have found most beneficial is a radical change of diet, fomentations of the feet for the purpose of allaying the primary inflammation, then blistering the coronets to stimulate the growth of new horn.

In the course of my experience I have never known an animal to be permanently injured by the malady. On the contrary, I know of several horses that were accidentally ergotized by the use of the hay in question, who had been sufferers from contracted feet and corns, and who, when recovered from the effects of the ergoted hay, had very good and well-shaped feet. And I think that, perhaps, the fodder which has proved so baneful to many innocent victims might be turned to good account in the treatment of seedy-toe and other diseases afflicting the horny structure. This is a point I hope will be discussed.

Before closing I wish to relate an instance of a mare with foal in utero. The mare became afflicted with ergotism, but carried her foal full time. When born, however, it was without any horny covering to the feet, except a narrow band of apparent new growth at the coronets. The foal lived and thrived for a few days, but the owner, thinking him a hopeless case, destroyed him. This I regretted very much, as I think the growth of horn over the apparently withered parts would have proved interesting and instructive.

Thanking you for your kind attention, I hope a useful discussion may follow.

## REPORTS OF CASES.

*"Careful observation makes a skillful practitioner, but his skill dies with him. By recording his observations he adds to the knowledge of his profession, and assists by his facts in building up the solid edifice of pathological science."*—VETERINARY RECORD.

## ACTION OF ESERINE IN FLATULENT COLIC.

BY RICHARD R. MORRISON, D.V.S.

Animal was a bay truck horse six years old, about fifteen hands three inches high; owner said he had been treated for colic three times previously. When admitted to the hospital he was suffering great pain and could hardly be kept on his feet; there was profuse perspiration, but not much swelling, therefore did not think it advisable to puncture at once, especially as owner said he had not been able to notice much difference for the previous half hour; he said he had given the animal a colic drench about an hour before he brought the animal to the hospital. As soon as the animal was put in a loose box he lay down and began rolling; he was given  $\mathfrak{z}$ j chloral, which kept him quiet for nearly an hour, at about which time he became violent; he would struggle until he got on his back, and then would lay quietly for a while. We made him get on his feet and he staggered about and fell, showing the effects of the chloral very plainly. Animal commenced to get worse, sweating more freely, mucous membrane getting pale, mouth cold and clammy; we then took gr.j eserine salycylas, pulverized it very carefully, added a few drops of aetheris sulph. and then added  $\mathfrak{z}$ ij aquæ destillata and dilating the left jugular vein injected it intravenously. The animal at this time was laying on his back perfectly still; in five minutes there was a passage of flatus followed in two minutes more by a discharge of feces. Animal then commenced to struggle again and in another eight minutes had a second discharge of feces which was accompanied by a good deal of flatus. Animal then began to be much easier, ceased struggling and lay quietly on his side instead of on his back

as before, and stopped perspiring; in about five minutes more there was a third discharge of feces; we waited for about twenty minutes more and animal still lay quiet, though occasionally passing flatus; there was no discharge of feces. We then went away and returned in an hour and found animal had had two more passages and was perfectly quiet; in another hour went to see him and found animal on his feet and apparently well. Next morning animal had ceased purging, and though he was kept under observation all day, he showed no bad effects from the treatment.

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## EXTRACTS FROM GERMAN PAPERS.

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### A CASE OF PURPURA IN A STEER.

BY J. STETTER.

Although this affection in the horse is often recorded in veterinary literature, it is seldom mentioned in respect to bovines. Called to attend a heifer, eighteen months old, the author found the entire surface of the body covered with crusts of various sizes, resembling dried blood. Some were of the size of a pea. Red rutilant epitaxis existed in the nostrils, and the pituitary membrane was covered with red patches. The nose, ears and extremities were cold; pulse, 81; respiration, 60; temperature, 37.1° C. There were red spots upon the buccal mucous membrane, shaped like dots, or in striæ, which were also found on the vaginal mucous membrane. There was complete anorexia. The animal was destroyed, and the post mortem revealed the following lesions:

The skin, subcutaneous cellular tissue, the surface of the muscles and the mucous membranes were literally stuffed with hemorrhagic spots and striæ, of various sizes. The blood vessels were gorged with blood; the pulmonary pleuræ highly congested, and the pericardium and endocardium covered with ecchymoses. The liver, kidneys and spleen, and the surface of the kidneys and of the intestines were also covered with red spots. These lesions, so commonly extensive, left no doubt in the mind of the author as to

their being those of anasarca, or *morbus mammosus*, analogous to that observed in horses.—*Wochens. für Thierh. and Viehz.*

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#### SUSPICIONS OF GLANDERS FROM THE PRESENCE OF A TUMOR OF THE SEPTUM NASI.

BY M. URBAN.

A horse presented the following symptoms: General condition quite good; abundant discharge on the left side, sticky and bloody; nasal opening covered with scabs; left sub-maxillary gland enlarged, hard, lobulated, and not adherent. Though no chancre or cicatrix could be seen or felt, a diagnosis of suspected glanders was made, and, by request of the owner, the animal was killed. A tumor was found on the superior third of the left nasal septum, brownish-red in color, of the size of one's fist, and from which pressure caused the oozing of a reddish-brown liquid.—*Wochr für Thierh. and Viehz.*

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#### UPON CEREBRAL TUMORS IN THE HORSE.

BY N. J. ECKARDT.

The author, clinical teacher in the Berlin Veterinary School, reviews all the cerebral tumors of the horse. He speaks first of the cholesteatoma, and of the various opinions admitted as to its action on the choroid plexus. If *Gurlt*, *Gerlach*, and *Bruckmüller* admit in general that these tumors produce no bad effects on the functions of the brain, so long as they are not larger than a pigeon's egg; others, such as *Kohne* and *Dunker*, have observed accidents, and inflammations of the brain, as consecutive to their presence, even when very small.

Eckardt then mentions a case of melanosis of the brain, published by Jessen, in the *Magazine von Gurlt und Hertwig*:

On opening the cranium of a horse which had died after a long sickness, Jessen found a melanotic tumor ten lines in diameter, situated outside of the dura mater, in the cavity of the left temporal bone.

The author then mentions two cases observed by himself, which are of interest on account of the symptoms, and also of the seat of the growth. The first was a cholestatoma of the size of a goose-egg, on the choroid plexus, in the left ventricle. The second was of the size of a pigeon's egg, and was situated in the third ventricle of the brain. This last, according to Eckardt, is the unique mention of cholesteatoma, in the third ventricle.—*Wochens. fur Thierh und Vichz.*

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#### VETERINARY CENSUS OF HOLLAND IN 1888.

On the first of January, 1888, there were 418 veterinary surgeons in Holland, of whom 179 were graduated, and the remaining 239 empirics, to whom the right to practice had been granted. This right will not be granted hereafter. On the first of July, 1888, thirteen students of the Veterinary School of Utrecht received diplomas. There are at present 95 students, 34 in the first, 25 in the second, 21 in the third and 15 in the fourth year.—*Æester Nonast fur Thierh.*

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#### FOLLICULAR CONJUNCTIVITIS IN DOGS.

BY PROF FROHNER.

According to the author, the dog is of all domestic animals the one most affected with diseases of the eye, follicular conjunctivitis in particular. This affection differs from other diseases of the conjunctiva—catarrhal, purulent or phlyctenulous—by its seat, being generally localized on the internal surface of the membrana nictitans.

It can be discovered by pulling it outwards, when it is seen covered with numerous dark colored, oval nodosities of the size of millet seeds, at first very small and in small numbers, but soon extending and increasing in size. Under the microscope they appear to be composed of a mass of lymphoid cells, and of a stroma. This affection may be complicated with catarrhal conjunctivitis, entropion, etc., etc. Irritation from foreign bodies, dust and eczematous affections

are common causes of the lesion. As treatment, which is long and difficult, Frohner recommends washes of boric acid, two per cent.; corrosive sublimate, half per cent.; salicylic acid, two per cent.; quinine, five per cent.; chloride water, ten per cent. This may answer at the beginning of the disease, but in later stages astringents are preferable, such as sulphate of copper, half to one per cent.; nitrate of silver, 0.5 to 2 per cent.; and Goulard's extract, one per cent.; if these fail, extirpation of the membrana nictitans is indicated.—*Archiv. fur Thierh.*

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#### EXPERIMENTAL TRANSMISSION OF GLANDERS TO SHEEP.

BY PROF. COSKOR.

Coskor inoculated on the internal face of the thigh of a sheep, a culture of glanders obtained after inoculation of glanders pus to a guinea pig. Two weeks afterwards the sheep presented all the symptoms of nasal glanders. The animal was killed four weeks after the inoculation, and presented the following lesions: Abundant discharge; large yellowish ulcer on the left inferior turbinated bone; chancre on the same side of the septum nasi; yellowish nodosities on the pituitary; lymphatic glands of the neck swollen with miliary tubercles, greyish and caseous; soft caseous tubercles in the spleen. Microscopic examinations of the discharge from the chancres of the tubercles of the hypertrophied glands, treated by the method of Loeffler and Schutz, revealed in them numerous glanders bacille.—*Berlin Thier Wochen.*

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#### DIABETES IN THE HORSE.

BY MR. HEIP.

Two cases of this affection were observed in the same stable, in horses used together in a team, the second case developing twenty-one days after the first.

This rare affection was recognized by the following symptoms: Slight icteric coloration of the membranes; pulse and heart action normal; rectal temperature also; auscultation

tion and percussion normal; appetite fair for oats, but hay refused; no renal pains on pressing, through rectal examinations; urination very abundant; urine examined by Trommer's test, presenting a deep red, yellowish precipitate; quantitative analysis showing 3.75 per cent. of sugar.

The symptoms soon became more and more accentuated, the animal beginning to lose flesh rapidly, and to become weak on his hind legs. Thirty-two days from the beginning of the disease a greyish spot was observed in the eye, which increased in size and soon terminated in a true ulceration of the structure.

At the post-mortem both horses were found in a state of excessive emaciation, and there was an hypostatic pneumonia, and a peculiar coloration of the liver, which was hypertrophied, but no other lesions.—*Wochens. fur Thierh.*

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#### DIAGNOSES OF GLANDERS.

BY MR. CHELSHOWSKI.

After passing all known means of reaching a positive diagnosis in cases of doubtful nature, and which often give more or less defective results, the author proposes the following as certain and rapid, viz: The removal of the submaxillary gland and its examination, both microscopically and macroscopically.

At the macroscopic examination, a section of the gland of glanders will show small nodosities, formed by little greyish masses, having a white-yellowish center.

For the microscopic examination, two modes are recommended: First, that of *Læffler and Schutz*. Immersions of the sections during twenty-four hours in a solution of the blue of methylene and of potash, and decoloration with acetic acid. Second, that of *Salis*.—Immersion during five or ten minutes in a solution of the blue of methylene, (one per cent.) and borax (one per cent.) and washing with water or weak alcohol.

Sections examined with high power immersion show granulations of glanders in various stages, containing some

bacilli. They are quite numerous in recently formed nodosities, but become less so when it is older.

The author has obtained positive results with this mode of inquiry in less than an hour. In one case, where the gland seemed to the naked eye perfectly healthy, he detected by microscopic examination a few rare bacilli of glanders.—*Cestirs. Monats fur Thierh.*

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## SOCIETY MEETINGS.

### OHIO STATE VETERINARY MEDICAL ASSOCIATION.

The semi-annual meeting of the Ohio State Veterinary Medical Association was held at Delaware, O., Tuesday, July 16th, 1889. The attendance was small, but almost all parts of the central and northern sections of the State were represented, and an interesting and instructive meeting resulted.

The morning session was occupied in the performance of surgical operations upon subjects procured by the local veterinarian, Dr. Wight. The clinic consisted of an operation on a case of "fistulous withers," performed by Dr. Tanner of Ashtabula with the assistance of others. The removal of a "sinusal polypus" which required trephining of the super maxillary and frontal sinuses was performed by Drs. Yonkerman and Hillock, and a few cases of lameness were presented for diagnosis.

At 2:30 p. m. the members convened in the parlors of the Hotel Donavin. The President, Dr. Hillock of Columbus, called the meeting to order with a few well chosen remarks. The Secretary, Dr. Torrance, read the minutes of the last meeting, which were adopted, and presented the official correspondence for discussion. Among the correspondence was a letter from Dr. J. C. Meyer, Jr., with an accompanying resolution condemning the practice of lancing and burning horses' gums as now in vogue. Dr. Meyer requested that the resolution be signed by the members present, but opinions were so conflicting that a motion was carried to lay the matter over until the next meeting, when Dr. Meyer might be present.

The first essay presented was read by Dr. G. W. Butler, who chose for the substance of his paper a "Synopsis of the practical points to be considered in the treatment of Collar Tumors, Fistulæ of the Withers, Abscesses under the Levator Humeri and kindred affections." The paper teemed with practical points and elicited an after discussion in which Drs. Miller, Torrance, McLain, Wight, Butler, Taylor, Tanner, Sheperd and Hillock took part. A discussion upon the treatment of open joints and bursæ ensued, in which Drs. Yonkerman and Butler participated. Dr. Yonkerman spoke at some length upon the "Modern Methods of Antiseptic Surgery," while Drs. Torrance and Miller discussed the practical methods of removing enlarged bursæ on the extensor tendons, the former favoring the free use of the trochar and canula, with injections of iodine, the latter advocating special astringent prescriptions applied externally.

Dr. Torrance reported a case of "Acute Diffuse Erythema," due to overheating a livery horse on July 4th. At the time of last seeing the horse, the body was entirely "nude" with an exception of a few hairs which still remained in the mane

and tail. The animal had survived an intense fever and recovery was looked for with also a return of the coat of hair.

Dr. Miller introduced the subject of myotomy, claiming great success in the straightening of tails by severance of the levator and depressor muscles of the concave curve. Dr. Torrance protested against the method, claiming that in the contraction of the cicatrix at a considerable period after the operation, the tail was again drawn more forcibly than ever to the same side. He advocated the removal of a V from the muscle of the convex side, and retaining the tail in splints until healed.

The meeting adjourned at 6 P. M. to re-assemble in the evening.

In the interim between the afternoon and evening sessions Dr. Miller of Seville performed the operation of myotomy upon two horses.

Meeting re-assembled at 7:30. Dr. Torrance addressed the meeting, proposing that the President appoint a committee to draft resolutions of condolence to be forwarded to the widow and son of the late Dr. John Yonkerman of Cleveland and to be recorded in the minutes of the Association. The motion was seconded by Dr. Tanner and carried. The President then appointed Drs. G. W. Butler, A. W. Wight and W. J. Torrance.

Moved by Dr. Torrance, seconded by Dr. W. P. Yonkerman, that Dr. Taylor of Marysville be elected a member of our Association. Carried.

Judge Jones (Ohio Board Live Stock Commissioners) upon being called upon by the President, addressed the meeting, making some interesting remarks upon foot rot and scab in sheep, hog cholera, etc., etc., and also presented the members present with the latest reports of the State Legislature upon these affections.

Drs. Hillock, McLain, G. W. Butler, and D. P. Yonkerman discussed the diseases mentioned by the Judge.

Dr. Yonkerman described two cases of spinitis, and Dr. Torrance described at some length the symptoms and pathological lesions of "Coma Somnolentum" in horses. Dr. Tanner reported two cases of "Oleander Poisoning;" Dr. Sheperd reported a case of persistent anorexia in a cow which finally recovered; Dr. Butler described a modified form of rumenotomy which he performed successfully on cows; Dr. Taylor described at some length an endemic of pernicious anæmia which was destroying large herds of horses upon the Derby Plains of Union County, Ohio.

Drs. Wight and others followed on the same subject. The President directed the Secretary through his correspondence to select the essayists, etc., for the following meeting.

Meeting then adjourned.

W. J. TORRANCE, V.S., *Sec'y.*

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#### NEW JERSEY STATE VETERINARY SOCIETY.

The New Jersey State Veterinary Society held its annual meeting at the White Hall Hotel, New Brunswick, N. J., on Thursday, August 1st, with Pres. Dr. J. C. Corlies in the chair.

The minutes of the last meeting were adopted as read.

The following officers were elected for the ensuing year:

Dr. Elden L. Loblein, of New Brunswick, President; Dr. Joseph Nayler, of

Jersey City, 1st Vice-President; Dr. W. H. Mook, of Metuchen, 2nd Vice-President; Dr. Chas. Kuehne, of Jersey City, was re-elected Secretary; Dr. A. H. McIntosh, of Jersey City, Treasurer; Dr. W. H. Lowe, of Paterson, Dr. E. R. Voorhees, of Plainfield, Dr. J. C. Corlies, of Newark, Dr. E. R. Mercer, of Montclair, and Dr. James McCaffrey, of Red Bank, were elected as the Board of Censors.

Dr. J. Hopkins, of Newark, Dr. W. Dimond, of Jersey City, and Dr. James McCaffery, of Red Bank, were elected as members.

Dr. E. L. Loblein, of NewBrunswick, read a paper on "Tuberculosis" which was followed by a lively discussion.

The next meeting will be held at Trenton next February.

The meeting adjourned and was followed by a banquet.

CHAS. KUEHNE, Ph.G., D.V.S., *Secretary*.

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## OBITUARY.

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Died, at West Newton, Mass., July 29th, Dr. Elisha F. Thayer, aged 73 years, 6 months and 27 days.

Elisha F. Thayer was born at Dedham, Mass., in December, 1815; his father was a practising physician, and for many years held the office of postmaster.

The subject of this sketch was from his early years thoroughly in accord with the animal kingdom, and filled with that love for the domestic animals which never left him to the day of his last sickness, even mindful and anxious for the welfare of a favorite animal long after the infirmities of age and disease had made such attentions on his part painful and distressing, and to this natural aptitude may be ascribed much of the success of his practice.

About 1850, Dr. Thayer began to ride and study with Dr. Charles Wood, of Boston, who at that time was one of the most noted veterinarians of that city. He continued riding with Dr. Wood and practising himself until 1853, when he went abroad to study, spending his time at London and Glasgow, at the latter place being a special student of the celebrated Gamgee.

He spent some months there, and on his return home entered again into practice, to give it up only when disease had made such inroads on an otherwise robust and vigorous constitution.

It was the lot of Dr. Thayer, and through him the veteri-

nary profession as well, to receive such recognition of his ability and knowledge as falls to but very few men.

In the early part of the sixties there made its appearance at Belmont, Mass., a new form of disease, in a herd of Dutch cattle, and Dr. Thayer, in company with Dr. George K. Dadd, of Boston, was sent by the State to investigate the case.

Dr. Thayer made his decision that there was an outbreak of contagious pleuro-pneumonia.

This opinion was further strengthened by new outbreaks in various parts of the State, and which could be traced back in every case as coming from the Belmont herd.

Dr. Thayer's views and advice were not received with favor by the medical profession, nor by some of his own profession, nor by many men at that time prominent in the agricultural interests of the State.

In 1862 Massachusetts established the Cattle Commission, and in company with two laymen, Dr. Thayer was appointed to serve as such.

This Commission and its successors adopting the views and advice of Dr. Thayer, went steadily at work to eradicate the disease, and in 1865 they were able to report to the Legislature that the disease had been stamped out.

The total expense of their operations amounting to about \$68,000, since which time there has never been an outbreak of the disease within her borders.

To the steady, persistent and untiring labors of Dr. Thayer, in the face of opposition, bitter in the extreme, strengthened and encouraged by professional as well as other friends, the State of Massachusetts owes her lasting immunity from this terrible cattle scourge.

For nearly twenty-five years Dr. Thayer was a member of the Massachusetts Cattle Commission.

He also was a member of the United States Treasury Cattle Commission in company with Prof. Law, of Cornell University, and J. H. Sanders, Esq., of Chicago.

Dr. Thayer was one who had ever an eye single for the advancement of the profession which he loved, and for the health and welfare of the animal.

He was a student, ever at work either in his library, on the dissecting table or on the subject, working long into the night; to be found again early among his clientage.

Blessed with a retentive memory, a thirst for knowledge, and an indomitable will and perseverance, how else could such a man impress those who knew him save with admiration and respect.

As a colleague of years standing has remarked, "He was a hard student, a good practitioner, a clean, honest man, and such a one as the profession can ill afford to lose. Would that there were more of them."

Free from any desire for position himself, it was only when fairly thrust upon him that he would accept such places.

One of the founders of the United States Veterinary Medical Association, he has ever shown the liveliest interest in its welfare until sickness and age prevented his attendance at its meetings. In 1869 the University of Vermont conferred on him the degree of M. D.

About ten years since he had a paralytic shock, from which he had never fully recovered, and yet since then he has done much work on both the State and National Commission, as well as in private practice.

He passed quietly away after an illness of about three weeks, evincing even to within a few days of his death much interest in a colleague's case.

In Dr. Thayer's death the profession has lost a member whose aim was ever upward and onward, not only for himself but for his profession, and his life is an example for the younger members of the profession to follow.

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## CORRESPONDENCE.

### A VETERINARIAN WANTED.

LOWENBURG BUILDING, NORFOLK, VA.

SIR:—Can you refer me to a veterinary surgeon who desires a good location? To the right man I have a good opening.

W. D. PENDER.

# AMERICAN VETERINARY REVIEW,

## OCTOBER, 1889.

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### EDITORIAL.

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OUR EMBARRASSMENTS.—Dilemma hard to solve—our summer vacation (?)—large amount of material in hand—crowd of interesting subjects—we must postpone their consideration, or our readers suffer—time is wanted. ARMY VETERINARY LEGISLATION.—We cannot, however, present ourselves before our friends without a word on that subject—Dr. Griffin's communication—the new bill offered—suggestions as to its passing Congress—cash may be necessary—let a fund be established and placed in the hands of the United States Veterinary Medical Association—we shall be pleased to hear responses on the subject and gladly open the subscription list. AMERICAN PUBLIC HEALTH ASSOCIATION.—The meeting takes place this month.

OUR EMBARRASSMENTS.—We find ourselves just now confronted by the worst dilemma it has been our fortune to encounter since the beginning of our editorial life and experience. Returning home from beyond the ocean, after what was intended to be a restful vacation, but which proved to be a period of constant and laborious activity, we find ourselves on the day when we should be quite ready for the issue of our October number, with but the scantiest amount of material in shape for publication and of interest to our readers, and are driven to the necessity of tendering the largest kind of an apology for a dereliction which we cannot deny and could not avoid. Our October issue this year ought to have been one of exceptional interest in both the quality and quantity of its contents. A crowd of interesting subjects require our notice, including a report of the proceedings of the Fifth International Veterinary Congress, Annual Meeting of the United States Veterinary Medical Association, re-opening of

the Colleges, and what more we need not stop to say. But the day of publication looms upon the calendar before our eyes, and we had almost said our courage fails us as we contemplate the misfortune of our inability to meet the readers of the REVIEW nearly, or quite on time as usual. With the hope that with their usual indulgence they will overlook an apparent neglect on our part, and offering them in return the assurance of full and careful attention to the important subjects which we have already mentioned, at an early date, we stand ready to respond with our best acknowledgments to the kind consideration which they stand ready to extend, and which we are already prepared to receive.

ARMY VETERINARY LEGISLATION.—Though embarrassed by lack of room and time, there is a subject which we feel that we cannot suffer to pass by without mention at this time. It is an important subject, and one which interests the *American veterinary profession* at large, in the person of their brethren who labor in the national army. It is true that we cannot at the present time present our views in such a manner as we desire to, but upon reading the communication of our worthy correspondent, Dr. G. E. Griffin, we feel impelled to say that the army veterinarians appear to have found in him the man who, if assisted by those who are interested, and by the profession at large, will be likely to succeed in obtaining for our colleagues in the army such a recognition as is due to their calling. The work necessary to be done, however, will consist in something more than the presentation of a suitable bill. Its passage will not prove to be a matter-of-course routine affair, but will only be secured by the hardest kind of a lobby fight against the objections of supercilious army officers and members of the West Point aristocracy *and their wives*. It will require much personal effort, and not a trifling expenditure of time, money, argument, persuasion and influence. Among other things, a fund of available cash will certainly be indispensable, to be disbursed under proper control and management; and with this object in view we would suggest the immediate opening of a subscription to be placed in the hands of the Committee on Army Legislation of the

United States Veterinary Medical Association. We shall be pleased to hear the views of our brethren on this subject, and shall be happy to appropriate the necessary space in the pages of the REVIEW for the publication of the names of subscribers to the fund. And if no one else cares to head the list, we shall feel honored in being permitted to do so with our own check.

AMERICAN PUBLIC HEALTH ASSOCIATIONS.—By special request we call the attention of our friends to the notice of the coming meeting of the American Public Health Association, which is to be held during the present month in Brooklyn. We hope to do better justice to the request of the chairman, Dr. J. H. Raymond, in our November issue; he will, with his usual kindness, excuse us at present for reasons we have already stated.

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## ORIGINAL ARTICLES.

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### GLANDERS IN MAN AND BEAST.

By P. PAQUIN, M.D., V.S.

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A recent accident in dealing with that disease, and of which the REVIEW gave editorially such kindly notices, prompts me to write a short article on the subject. I intended to do so later, as I am engaged in some slow original researches concerning glanders, but the many conflicting and erroneous notices of the press about the accident in question, and the apparent confusion that seems to exist in the minds, even of the most conspicuous of veterinarians and physicians about the nature of the disease, have determined me to delay no longer at least a few words.

For reasons without foundation, the popular idea that glanders in man *must necessarily be fatal* seems as prevalent among veterinarians as among the laity, so much so that some of the leading men have expressed this view in unmistakable terms in letters to me and in the press. Does this come from the fact that nothing really new has appeared of

late on this subject in veterinary literature, or is it because of a sort of lethargy that makes us take for granted the writings, sayings and popular notions of old time? It is, perhaps, well in practice to acknowledge the incurability of any disease of a deadly character when science and practice point towards such a conclusion, but is that a reason why medical men must stop and accept for granted this conclusion? What is there absolute in disease? If since the beginning of the world a disease was found uncontrollable, is it a reason to stop our inquiries and accept views a century old? Hydrophobia was beyond the reach of human skill once; is it not now mastered? It is a grave error that medical men make when they pronounce a diagnosis of fatality just because the disease under treatment is known to the world as incurable. Now I say without further comments that *glanders* in *man* is sometimes curable, and that even in the race of animals most susceptible, it occasionally takes a form in which *without* treatment, contagion becomes impossible at least for a time. I will proceed to give evidence.

Take Ziemssen's "Cyclopedia of the Practice of Medicine," Vol. III on chronic and infectious diseases, pages 352 and 368 (American edition, published by Wm. Wood & Co., New York, 1875, edited by Albert H. Buck, M.D.) There you will find sufficient evidence I think to convince the most skeptical, that *glanders* is not necessarily deadly. Ziemssen there gives the following tabulation written by Bollinger:

In thirty-eight case of *acute glanders* in man, recovery ensued in one instance. In seven cases of *subacute glanders*, recovery in two instances. In thirty-four cases of *chronic glanders* recovery in seventeen instances.

Bollinger assigns an "*absolutely* unfavorable diagnosis in *acute glanders* only; the subacute and chronic forms permitting a relatively *favorable* opinion as to the termination." Out of a total of one hundred and twenty cases of *glanders* in the human subject that he "succeeded in finding," the recoveries were equivalent to twenty-three per cent. In the same pages it will be found that Hauff gives account of 11.4 per cent. of recoveries; that Virchow acknowledges some

cures and that in a word glanders should not, in man, be considered always mortal. The article on glanders in Ziemssen's work is based on the authority of nearly fifty writers, among whom we find those previously mentioned, plus Greve, Kreutzer, Spinola, Gerlock, Bouley, Lafosse and others, whose names are well known to medical science.

In support of this testimony I might add the following two positive cases of glanders in man, both of whom are living to-day. The first occurred in 1887, in the fall of that year. I was called to Burlington Junction, Nodaway County, Missouri, to attend officially to a contagious disease among stock. I found eight cases of glanders in four different farms, nearly all adjoining. All the cases come from or had been contracted at one and the same place originally. One of the owners, whose name is Hiram S. Pierce, had treated his two diseased horses and had been inoculated through a raw sore on the left hand. Virus from his horse's nostrils killed guinea pigs with glanders in five weeks and seven weeks respectively. I had the horses killed. Mr. Pierce had then been in possession of them only a few weeks, if I remember well. He had received them in trade from a man who called the disease distemper. He had treated them not longer than four weeks, and when I saw him he had had symptoms of glanders about fifteen days. The physician he consulted did not understand the case and so the patient was not much alarmed by the uncertain prognosis. I found induration of lymphatic courses in the affected arm, suppuration of the epitrochlean gland at the elbow and suppuration of farcy character at the foot on the same side. The man walked to the field with me without a shoe—he could not put one on—and limped slightly. His father lived in, and was the honorable representative of Logan County, Ill.,—the papers said. Mr. Pierce went there and was examined and I was informed that the virus was tested by Dr. Rouch, Secretary State Board of Health of Illinois. He pronounced the case glanders. Then Doctor Leeds, of Lincoln, Ill., took charge of the case, and here is his letter in reply to a recent inquiry of mine concerning it.

LINCOLN, ILL., June 6, 1889.

*J. H. Rauch, M.D., Springfield.*

Dear Doctor.—In reply to Dr. Paul Paquin's letter, forwarded to me and herewith enclosed, I first saw the case mentioned, (H. S. Pierce affected with glanders), in November, 1887. Mr. Pierce was under my observation from that time till April, 1888. When first seen he had a "running sore" on the left arm at front of elbow, one near the left knee and one near the left ankle. Much stiffness and considerable swelling of the limbs involved.

For local treatment I used iodoform powder on the ulcers and applied rubber bandages. Internally, Syr. Fer. Iod. f. ʒ j. t. d. and Fowler's solution, beginning with m. v. t. d. for two days, then m. vj. two days, and so on till ten drops were taken, then decreasing the dose in reverse order and repeating.

I take pleasure in reporting that Mr. Pierce has *completely* recovered his health. He is free from stiffness in the limbs and has his normal strength. His complete freedom from symptoms has now continued just about one year.

Courteously,

L. L. LEEDS,

Per K.

The other case is one now in charge of Dr. Griffith, member of the Missouri State Board of Health, Kansas City, Mo. He contracted glanders in 1887, I think, and is still living. I saw Dr. Griffith in May at the Missouri Medical Association meeting, Springfield, Mo., and he informed me that the patient is doing fairly and at work. His lymphatic system, however, is still affected and presents chronic lesions. The case and its history I know well through Dr. Griffith, and it is undoubtedly glanders. Now as to my own case I will neither assert nor deny that it was glanders, but the trouble I know was due to inoculation of matter from a mare which had glanders decidedly pronounced. The same matter inoculated to two guinea pigs by a student here, killed one some fifteen days or so afterwards and the other in about six weeks. Both died in my absence, and as I had left in great hurry and had made no arrangements for preserving the specimens or for close examination, I cannot say what was the cause of death; besides I was not told of the death of the guinea pigs until after my recovery. The mare died, as did three other horses and mules on same farm, all from glanders.

It was on the 22d day of March, at Lees Summit, Mo., that the accident occurred. While examining the mare just mentioned, she blew her nose, and a great deal of matter cov-

ered a good portion of my face, my right hand and wrist, and some struck the right cuff inside and outside. The cuff was very stiff, and was immediately scraped with my pocket knife after washing off the besmeared hand and face well. It was about eleven o'clock, A. M., and I resolved to wash better and take the cuff off before dinner, having then one more animal to examine. However I forgot to take it off, and rode a whole afternoon with it on. That night at ten o'clock I was about to retire for the night at the Centropilis, Kansas City, and found the first indications of danger. That right cuff had on its edge a stiff, ragged point, turned out like the tooth of a saw; on the inside part of this point was glanders virus, and the besmeared, stiff, ragged point had rubbed crosswise on the wrist about ten hours. It had made a one-inch long, red (almost raw) mark like that produced by scratching with an ivory point for vaccination. The friction of this cuff tooth with the virus on, had, in other words, produced an irritation sufficient to cause smarting. I washed the place well and felt easy enough, because I had dealt with glanders before, I may say, weekly during four years, and I feared the disease little. Four days later found me on a Wabash train on my way to Columbia, my home. It was early in the morning, and I had slept fairly. My wrist was paining me some and felt stiff. I looked at it, and found what made me shiver for the first time since the previous winter. At the very point of the irritated tract was growing a little boil, slightly yellowish. I had no cauterization agent, (when opening my caustic case I found it destroyed) and I was twenty miles away from home on a slow train. I became rather fearful, and at once squeezed the vesicle. The matter looked just like that which we find in small farcy buds, and the bottom of ulcer was indurated. I scraped this out with a pocket lance, and as soon as I reached home I dropped a few drops of boiling water in it, and in a few days it was healed. That night I had a little fever, and next day I made arrangements, under advice of two physicians, Profs. Moss and McAlester, to go to Hot Springs, Ark., where I arrived the sixth day after the inoculation.

The fifth day an epitrochlean gland at the right elbow be-

gan to enlarge and feel painful. It gradually grew larger and larger, and then the lymphatics from it became similarly involved. Some days later Dr. Greenway, one of my physicians there, discovered adenites in some glands of the neck. He and Dr. Gaines, who had charge of the case, can testify to this condition. The glands remained so for three weeks, and during all that time the temperature was one or two degrees above normal at times and normal at others. A day or two after the healing of the first bud on the wrist, another one grew, about one quarter of an inch from it, and directly in the primitive irritated line. It became red one day, and next morning it was beginning to fill and it was at once cauterized before virus was sufficient to gather, and indeed I was by that time in no mood to wait for virus to be in sufficient abundance, or for pipettes or vial to gather the infernal poison, if such it was. So I failed to make any inoculative tests or microscopic study to ascertain the nature of the disease. The last ulcer was rebellious. It took six weeks to heal it. It finally coalesced with the mark of the first one and now there is on my wrist but one cicatrix which will probably always show, and there remains a slightly indurated but painless gland at the right elbow. The treatment consisted of iodide of potassium from the fourth day after inoculation to the end of six weeks, and then Fowler's solution of arsenic for a few weeks longer. I began the iodide of potassium at the dose of ten grains three times a day, and in three weeks I was taking *eighty-five grains* (85) three times a day, or 255 grains daily. Besides this I was treated with mercury in local frictions—one dram of the officinal ointment daily, until constitutional effects were apparent. In order to correct the injurious effects of the potassium on the stomach and head, I took with it bi-carbonate of soda for the first, and a few drops of tinct. of bellad. for the last correction. I took hot baths every day, and perspired one to three hours each time. By this means the kidneys did not have to eliminate all the strong medicines and they stood treatment well. After I returned home I continued treatment, gradually lessening the dose, and finally dropped the potassium and used Fowler's

arsenic at three to five drops. I have not used anything for about three weeks, and feel now well and strong. Now was it glanders? I for one, care not what the verdict. I did not feel like awaiting ten or twelve days for development to make a scientific and sure diagnosis. The fact that so many die from the disease is in a large measure because physicians do not know its nature and symptoms, and generally diagnose it only when too late, sometimes even after death. They too usually think that a glandered man *must* die anyway.

Now a word about glanders in animals. Is glanders always incurable in them? I know now a horse living, which three years ago inoculated three mules successively, all of which died with glanders. One guinea pig I myself inoculated also developed glanders clearly and died, and the horse (a stallion) which was valuable, therefore kept in quarantine, has not to-day any discharge from the nose; the ulcers on the septum nasi are healed and have left irregular glossy-white cicatrix; the sub-maxillary glands have reduced and are hard and painless, and the horse looks perfectly healthy. He has been so for over thirteen months. I have in the last year repeatedly inoculated various material—very thin as a rule—from his nose, and failed always to produce any disease in susceptible stock.

Nor is this an isolated case. I have two similar ones on record, and on one of them I made a post mortem examination in 1887. I found many indurated lymphatics but no virus. Found portions of both lungs perfectly solid with a deposit of calcareous appearance—a cretification which the edge of the knife could not incise. I have written enough though—much more than I intended to, and I fear that it is rather poor literature, as I write in haste. I hope the readers of the REVIEW will forgive me this. Owing to my late trouble I am greatly behind in my official work, and am compelled to hurry things along.

In conclusion I extend my heartfelt thanks to the many kind friends in the profession who so feelingly expressed their sympathies directly or indirectly to myself, my wife, or my mother and her family during our time of trial.

## TRANSVERSE DEVELOPMENT OF THE FŒTUS OF THE MARE.

Paper read before the Illinois State Veterinary Medical Association

BY W. L. WILLIAMS, V.S., Bloomington, Ills.

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Writers on veterinary obstetrics freely admit the occurrence of a transverse presentation of the fœtus of the mare at time of parturition, but deny, either directly or inferentially, that it is the result of transverse development, and ascribe such mal-presentation to accidental changes in the position of the fœtus during labor.

All experienced veterinarians will admit that this transverse presentation is by no means rare, and there seems to be no good reason for doubting, in general, the assumption that it is attained during labor, the form and position of the generative organs of the mare, the position in which the fœtus is generally found during pregnancy, and the form and size of the fœtus itself, all tending to deny the probability of actual transverse fœtal development.

Recent clinical and post mortem observations have demonstrated, however, that transverse fœtal development may and does occur, these cases being rendered interesting, not only from an anatomo-physiological standpoint, but from the well nigh insurmountable obstacles which such development offers to parturition.

Three cases, occurring in my practice, and which I shall briefly describe, form the basis of my remarks.

The first case, occurring in the spring of 1887, was that of an imported Percheron mare, property of J. S. Hanna, Bloomington, Ill. The animal was large, well developed, roomy, in good general health and condition, had never worked, had reared foals previously without difficulty in parturition, and had attained the usual period of gestation without offering anything unusual. The keeper summoned me to attend the mare, stating that she appeared uneasy and that he believed her to be in labor, and that the case was, in some way, unusual.

Upon examination no labor pains could be observed and

when manual exploration of the vagina was attempted, a marked constriction of vagina at the usual position of the os was mistaken for it, and at this point a live foetus was plainly felt, apparently with all membranes intact.

In the absence of labor pains or rupture of the membranes and as the mare was feeding quietly, I advised non-interference for a time, with close watching.

The mare continued fairly well and quiet for about forty-eight hours when, on being called again, I found foetal envelopes protruding from vulva. On inserting my hand into vagina the foetus was again encountered in the same position as before, but on careful examination it was found that the previously supposed os uteri was merely the constricted portion of the vagina beneath which lay the foetus. By following the protruding foetal envelopes it was easy to find the opening into the uterus, but all semblance to the natural os had vanished.

Far away anteriorly, barely within my reach, the vagina, extremely narrow throughout its entire length, opened abruptly *downwards* and *backwards* into the uterus, while back of this opening and beneath the vagina, lay the body of the foal in a transverse position, readily felt through vaginal and uterine walls, but beyond reach through the os so long as the mare was standing, but when recumbent, the hind legs were barely within reach. After patient and exhaustive work the hind legs were corded at hock, but it seemed impossible to get the limbs into passage until the legs were amputated at hocks. We then had the hocks presenting with ossa calcis pointing upwards, while beneath the vaginal walls could still be felt the main volume of foetus. Firm traction applied to the hind limbs finally brought the foetus away after about five hours assiduous labor.

Examination immediately after the delivery revealed an extensive and fatal rupture of the inferior wall of vagina and that portion of the uterus in contact with it and the mare was destroyed at once.

Being late at night and all hands thoroughly exhausted, no autopsy was attempted and the cause of so curious and vicious a presentation was left unexplained.

The mystery was only deepened a few weeks later when I, in company with our Secretary (Mr. Pease), then a student with me, was called to attend a large, well-formed, high grade French draft mare, property of a Mr. Van Horn of Normal, Ill. She was in excellent condition, had bred successfully before and the usual period of gestation had passed without incident. The foetal membranes protruded, but no well marked labor pains were recognizable. Exploration revealed an exceedingly long, narrow vagina which, at its anterior extremity barely within reach, opened abruptly downwards and backwards, the usual conformation of the os being wanting. On passing the hand into the uterus, while the mare was standing, nothing could be felt posteriorly nor to right or left, while anteriorly could be felt only the perpendicular wall of the uterus which should ordinarily have formed the superior wall. Posteriorly to this opening, and beneath the floor of the vagina the foetus could be plainly felt, and by passing the hand through the uterine opening, drawing the posterior margin of the opening firmly backwards and reaching as far downwards and backwards as possible, a portion of the foetus could be barely touched, but not grasped.

After casting the mare and placing her upon her back, one hock was corded, and with great difficulty brought into the passage. Next a foreleg was secured and amputated, and then after great labor and much valuable assistance from Mr. Pease, the other hind leg was secured, and with strong traction the foetus was brought away after some eight hours exhaustive labor.

The mare lived about twenty-four hours and succumbed, and the owner being dissatisfied, no opportunity for examination was offered.

My third case was that of a grade draft mare, large, well formed, in good condition, had bred before without accident, and had completed the usual term of gestation. The owner resided in Minier, Ill. and I was called in to assist Mr. H. L. Ogden, a local practitioner and fairly successful obstetrict, but who was unable to deliver the mare.

The vagina was found abnormally elongated and con-

stricted and opening abruptly downward and backward at anterior end without any semblance to the usual intra-vaginal-projecting os. The fœtus could be plainly felt beneath the vagina and posteriorly to the opening into uterus. The fœtus lay with its back resting against the pubis of the mare, and by passing the hand through the opening into uterus, then downwards and backwards the elbow of one fore leg could be touched with difficulty.

After long and arduous effort, this fore leg was secured and brought into the passage. All efforts to secure other limbs or parts of fœtus either by raising abdomen by means of a sheet passed underneath and drawn up by means of pulleys or by casting mare upon her back, proved unavailing and the mare was destroyed.

An autopsy was held at once, showing a large, well-formed and matured fœtus lying on the right side with dorsum against the pubis of mare, the head in right uterine cornu, the hind legs in left cornu, the body occupying a thoroughly transverse position. The body of the fœtus lay positively to the uterine opening, one fore leg flexed at knee, the other (which we had secured) being drawn backwards over the neck of the fœtus into the vagina.

The two cornua, owing to peculiar development of fœtus, instead of being practically parallel and corresponding in their longer axis, to that of the mare, were disposed opposite to each other in a transverse position. The vagina was much elongated and narrow, and its opening into uterus bore no resemblance to the ordinary os. The opening was abrupt downwards, the superior wall of vagina suddenly losing itself by turning abruptly downwards, where it was continuous with the perpendicular anterior uterine wall. The inferior wall of vagina terminated abruptly in a thin margin; what had previously been the inferior wall of uterus, being turned upwards and backwards against vagina, thus forming the *superior* uterine wall.

From the position of the fœtus in the uterus, and the equal development of the uterine cornua, this case must be considered a bona fide transverse or bi-cornual foetal develop-

ment, and judging from analogy there can be but little doubt that the other two cases were identical with this one.

The causes which lead to such transverse development are not clearly understood. Downward and backward uterine displacement occurred in all my cases, being certainly not primary, but secondary in character, due to the unusual mode or direction of foetal development. Fleming mentions uterine displacements, but in those cases the displacement is described as occurring directly downwards, and the foetus presenting in any of the ordinary positions. In the cases recorded above, bearing in mind the usual form and position of the uterus and its cornua and the foetus, it is impossible to imagine how the uterus could be so displaced, except through some fundamentally vicious position of the foetus during its development. It would seem, therefore, that this anomaly in gestation is due to the impregnated ovum developing transversely for a time in the body of the uterus, and later extending more or less equally by the extremities into both cornua.

Franck and other observers tell us that the foetus in the mare, during the earlier stages of gestation, develop mainly in one cornu, bearing the gravid cornu downwards toward the inferior abdominal walls, and with this bearing downward and forward, the vagina suffers consequent elongation and narrowing. Later on in pregnancy, in this normal position, the foetus extends and develops more and more into the body of the uterus, the longer axis of mare and foetus corresponding, the anterior extremity of foetus gradually approaches the os, relieving the previous tension upon the vagina, and slowly pushing the os towards the vulva, permits the vagina to dilate laterally.

When, however, the development takes place in the body of the uterus, with the long axis of the foetus transverse to that of the mare, we can readily understand that in the earlier stage of foetal life, the same change in position of the genital organs must occur, except that the foetus would necessarily bear the uterus down nearer to the os pubis than though the development occurred in one cornu, and the transverse position of the foetus necessitating extraordinary

transverse development of the body of the uterus, practically prohibits any linear uterine development or extension so that the actual forward displacement must take place at the expense of the vagina. But by what means does the foetus attain a position posteriorly to the os uteri and beneath the floor of vagina?

The most tenable theory to me is, that in the earlier stages of this transverse development, the foetus lies with its back downwards towards the inferior abdominal walls, and the abdomen upwards toward the spine of the mare, which is the normal position of the foetus at this stage when normally situated in one of the cornua.

With the foetus developing in the body of uterus, the two cornua, not bearing their normal weight, would naturally assume a practically perpendicular position. When, however, the hind and fore extremities attain considerable size and weight and push their way up into the cornua, the equilibrium of the foetus is soon disturbed and the newly attained weight bears the cornua downwards, increasing the tension upon the vagina and the superior walls of the uterus, the body of the foetus partially turning on its axis, decreasing the tension on the inferior uterine wall, and by this turning, displacing and pushing it upwards and backwards, against the inferior vaginal wall, the back of the foetus resting against the pubis of the mare.

The diagnosis of this anomaly should prove comparatively easy. We note the abnormally long and narrow vagina; the absence of the usual projection of the os uteri into the vagina, and in its stead an abrupt opening of variable size, downwards and backwards at the extreme anterior end of the vagina; the foetus lying more or less transversely, inferiorly to the vagina and posteriorly to the os, where it can readily be felt through the vaginal and uterine walls, and generally, the inability on the part of the mare to make any true expulsive effort.

The prognosis must be uniformly grave, some cases offering apparently insurmountable obstacles to delivery, while in those cases, where after herculean labor, the obstetrice succeeds in removing the foetus, he finds that a fatal rupture has

been unavoidably caused, or, escaping this danger, the animal most likely succumbs to exhaustion or metro-peritonitis, due to the protracted labor and manipulation.

The indications are, to place the animal on her back, then secure any extremities which can be reached and bring them into the passages.

If the hind legs are secured, it may be found impossible to get the feet into the passage, in which case the legs should be amputated at the lower part of the hock joint, leaving the os calcis uninjured.

If all the anterior extremities can be secured and brought into vagina, and hind legs are not in the way, embryotomy will probably prove unnecessary. If two fore legs only, or one leg and head can be brought into passage, remove one leg and shoulder subcutaneously, take out one or two of the exposed ribs, eviscerate and then try to secure missing member. If the head cannot be reached after the removal of shoulder and evisceration, the foetus can be withdrawn, with head and neck doubled back.

If both hind and fore legs can be brought into vagina, amputate the fore ones, and by traction on hind ones, convert it into a posterior presentation.

In removing the foetus, after securing the extremities and making the above suggested preparations, great care and judgment should be used in the amount and direction of traction employed, and the mare should, I think, be kept upon her back during this part of the work, so as to throw the foetus and uterus as nearly as may be, in a line with the vagina, thus facilitating the attainment of a favorable position by the foetus and lessening the danger of a fatal rupture by decreasing the strain on the inferior vaginal and superior uterine walls, which lie in contact; the foetus, from its position, having first to pass forwards before it can enter the vaginal canal. If due care is not used at this point, it can readily be seen that if the body of the foetus still rests beneath the vagina, and the members of one extremity are in the passage, severe and hurried traction can scarcely fail to lacerate or rupture the intervening inferior vaginal and superior uterine walls. The amount of trac-

tion required is usually great, the mal-position of foetus and uterus preventing effectual expulsive force on the part of the mare.

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**MODERN FEEDING OF PIGS,  
AND ITS INFLUENCE UPON THE FORMATION OF THE SKULL  
AND DENTITION.\***

BY OLOF SCHWARTZKOPFF, V.M.D.

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During the past few years many objections have been raised, on the part of our practical breeders, to the correctness of the older rules for recognizing the age of our domestic animals. Several cases of an extraordinarily early development of dentition have been observed in fat stock shows, and other exhibitions, and it has been alleged that modern feeding, with the tendency to produce early maturity, results also in an earlier shedding of the teeth. Not only in the United States have these doubts been heard, but also in England and Germany. In 1882 Prof. G. T. Brown published in the journal of the Royal Agricultural Society, of England, an article in which he comes to the conclusion that, as a general thing, the views of the breeders cannot be relied upon, and that the recognition of the age from the teeth is still the best and surest. In June, 1886, the executive committee of the fat stock show at Berlin preferred similar complaints, and requested the Minister of Agriculture to introduce new experiments at the veterinary schools and agricultural experiment stations in Germany, to ascertain whether the signs of age from dentition, sexual development and growth of horns, can appear at an earlier time in our precocious breeds, than hitherto believed. Accordingly, Prof. A. Nehring, of Berlin, published in the "Landwirtschaftliche Jahrbucher, of 1888," a series of new dentition tables for pigs, as a result of his studies and investigations upon a collection of one hundred and thirty-one skulls of different kinds of pigs, at the museum of the Royal Agricultural School at Berlin.

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\* Reprint from Bulletin Agricultural Experiment Station, University of Minnesota.

Having seen and examined parts of this collection, I will undertake to demonstrate, with the guide of the above mentioned tables, together with my own experience and observation while practicing in breeding establishments, that our practical men have been quite right in many cases, and that the doubts to which reference has been made are not without foundation.

Before entering into the variations observed, I will briefly review what is accepted concerning the dentition of the pig.

This animal has two sets of teeth, a first called the temporary or milk teeth, which after a certain term of general development of the animal, are replaced by a second set, called the permanent teeth. In both the temporary and permanent dentition we distinguish three kinds of teeth, according to their form and purpose; these are called—first, the incisors, placed in the anterior portion of the jaw for taking up the food; second, the tusks or canine teeth, which are looked upon merely as a natural weapon; and third, the grinding teeth, or molars, in the posterior part of the jaw, for the mastication of food. The permanent molars are divided into premolars and molars; the rudimentary tooth, commonly known as wolf's tooth, being counted with premolars. The wolf's tooth and the three permanent molars come into place without being preceded by milk teeth.

Because of certain difficulties in describing the number of these different teeth, their disposition in the jaw and mode of succession, it has become a practical usage to represent these particulars in a dental formula; such is a combination of letters and figures being very convenient for reading and writing. The following formula we will adopt for our purpose:

I. TEMPORARY OR MILK DENTITION, COMPLETE.

6 upper. }	incisors,	Formula of Temporary Dentition for one side of the Jaw.		
6 lower. }	<i>i.</i>			
2 upper. }	tusks or	INCISORS.	TUSKS.	MOLARS.
2 lower. }	canine teeth,			
	<i>c.</i>	<i>i</i> 1, <i>i</i> 2, <i>i</i> 3,	<i>c.</i>	<i>m</i> 1, <i>m</i> 2, <i>m</i> 3,
6 upper. }	molars,	<i>i</i> 1, <i>i</i> 2, <i>i</i> 3,	<i>c.</i>	<i>m</i> 1, <i>m</i> 2, <i>m</i> 3,
6 lower. }	<i>m.</i>	14 on each side.		28 on both sides.

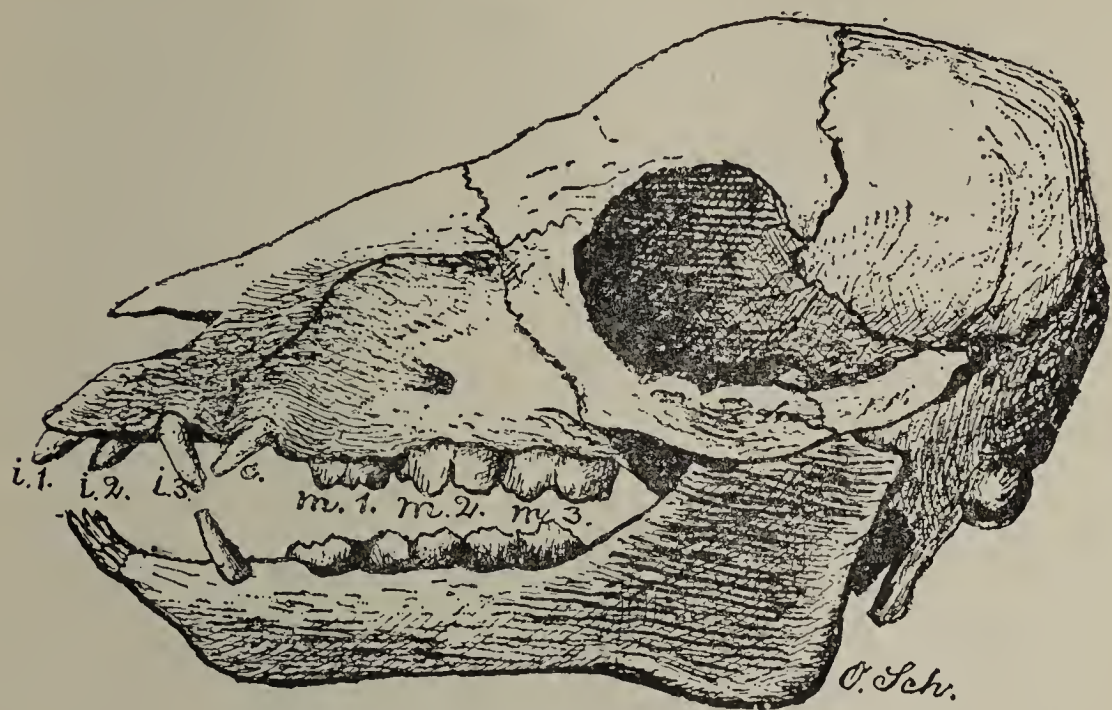
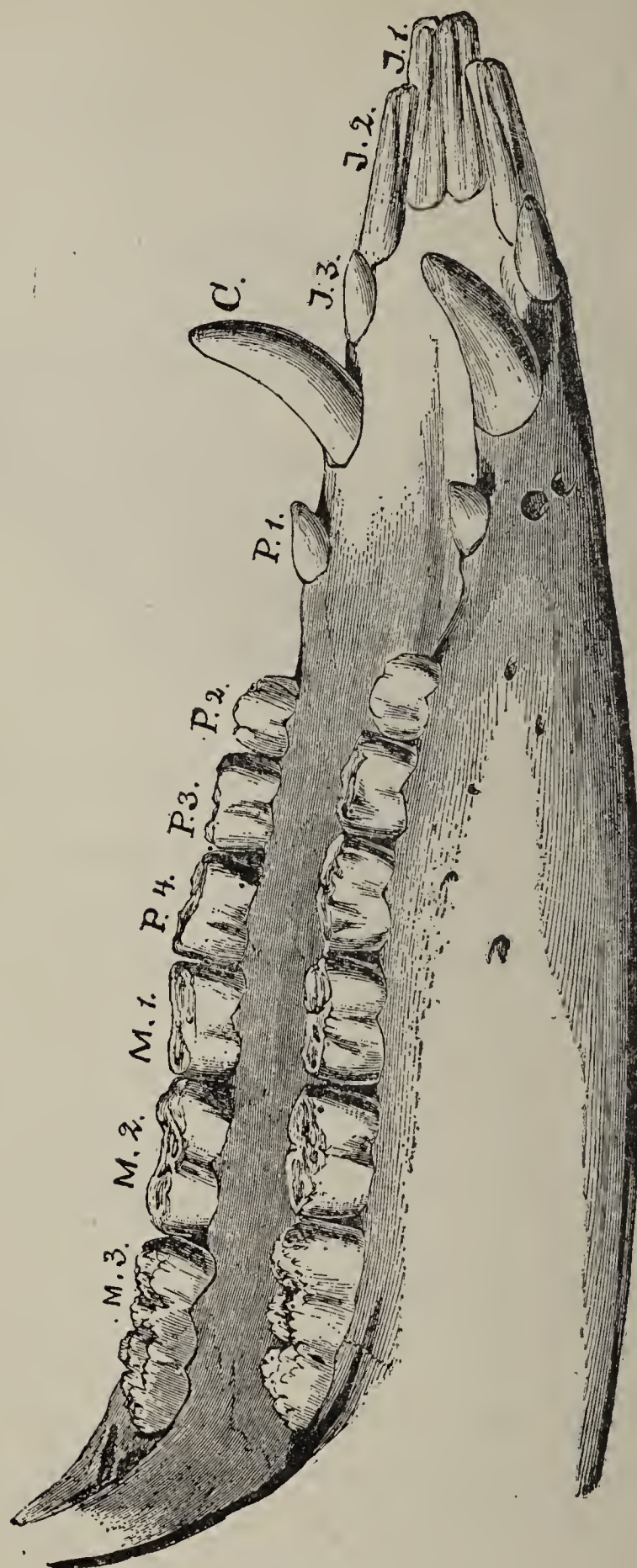


Fig. 1.

Skull of a three months old pig, with full milk dentition. (Original.)

II. PERMANENT DENTITION, COMPLETE.

6 upper. } 6 lower. }	Incisors, I.	Formula for Permanent Dentition for one side of the Jaw.			
2 upper. } 2 lower. }	(Tusks,) Canine. C.				
P 1, Wolf's tooth, if present.		INCISORS.	TUSKS.	PREMOLARS,	MOLARS.
6 upper. } 6 lower. }		I 1, I 2, I 3,	C.	P 1, P 2, P 3, P 4,	M 1, M 2, M 3,
Premolars, P.		I 1, I 2, I 3,	C.	P 1, P 2, P 3, P 4,	M 1, M 2, M 3,
6 upper. } 6 lower. }		22 on each side.			
Molars, M.		44 on both sides.			

**Fig. II.**

Lower jaw, showing permanent dentition. (After Rhode).

Making use of these dental formulas, I will proceed to explain the development of the milk and the permanent den-

tion, comparing both the old observations and the new. This method will prove that there is a remarkable difference in the time occupied by the teeth in cutting their way through the gum and appearing on its surface, while the mode of succession remains unchanged. But it must be remembered that the dentition tables, still referred to in modern books for the practical pig breeder, are based upon observations made in times when the common pig was raised, or, perhaps, a breed more or less improved by English stock, and fed in the old fashioned style. Variations into early maturity were then described as abnormal; but as soon as the pure breeding of the favorites of our day commenced, Berkshire, Poland China, *et al.*, and we applied to them scientific feeding, we forced the animals into entirely new and artificial conditions, revealing the hitherto unknown physiological laws of early maturity.

The young pig comes into the world with eight teeth, *I* 3 and *C*, that is the corner incisors next to the tusk, and the tusk itself. These teeth look very much alike, and evidently have the purpose of assisting the tongue in sucking.

Between 4 and 14 days appear two milk molars, *M* 2 upper and *M* 3 lower jaw. From 2 to 5 weeks break through *M* 2 lower and *M* 3 upper jaw, and at about the same time *I* 1 upper and *I* 1 lower jaw. Between five weeks and three months appear *I* 3 and *I* 2 lower jaw, followed shortly after by *I* 2 upper. With this tooth the milk dentition is finished--the normal time being three months. The longer time mentioned in each case is the time at which the various teeth appear in the primitive hog, and the shorter time is that at which these teeth may appear in our improved hogs.

The milk dentition is now resting for a time, seemingly to prepare for the growth of the permanent teeth. Between 2 and 6 months the first permanent molar *M* 1 will appear, and together with it the wolf's tooth. The other teeth are replaced in the order in which they succeeded in the milk dentition. Thus we see *I* 3 and *C*, at 7½ to 10 months, followed shortly by *M* 2 upper and lower jaw. In about 12 months, *I* 1 lower will appear, while *I* 1 upper jaw sometimes comes as late as 15 months. After changing the premolars, *I* 1 and *M* 3 appear in from 11 to 22 months. Between 16 and

17 months are replaced *I* 2 upper and lower jaw. At almost the same time appears the last molar, *M* 3, in upper and lower jaw. Now we have a fully developed permanent dentition, which is illustrated in Figure II.

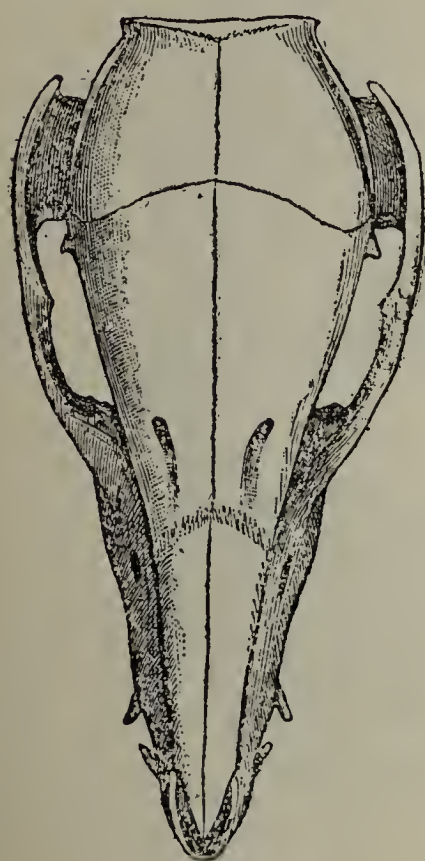
For the practical use of the swine-breeder, I will summarize what has been discussed above in the following

TABULAR VIEW OF THE DENTITION OF THE PIG.

	TEETH.	Precocious Pigs.	Normal time of Appearance.	Primitive Pigs.
Milk Dentition.	<i>i</i> 3, and <i>c</i> .....	Present at Birth.		
	<i>i</i> 1.....	2 weeks.	3-4 weeks.	5 weeks.
	<i>i</i> 2, } upper jaw .....	8 weeks.	12 weeks.	16 weeks.
	} lower jaw.....	5 weeks.	8 weeks.	12 weeks.
	<i>m</i> 1, both .....	5 weeks.	7 weeks.	9 weeks.
	<i>m</i> 2, } upper jaw .....	4 days.	8 days.	14 days.
	} lower jaw.....	2 weeks.	3-4 weeks.	5 weeks.
	<i>m</i> 3, } upper jaw .....	2 weeks.	3-4 weeks.	5 weeks.
	} lower jaw.....	4 days.	8 days.	14 days.
Permanent Dentition.	<i>I</i> 1.....	11 months.	12 months.	14 months.
	<i>I</i> 2.....	16 months.	18 months.	21 months.
	<i>I</i> 3.....	7½ to 8 mos.	9 months.	10 months.
	<i>C</i> .....	3½ months.	9 months.	10 months.
	<i>P</i> 1.....	2 to 3 mos.	5 months.	6 months.
	<i>P</i> 2.....	13 months.	14 to 15 mos.	16 months.
	<i>P</i> 3.....	12 months.	13 to 14 mos.	15 months.
	<i>P</i> 4.....	12 months.	13 to 14 mos.	15 months.
	<i>M</i> 1.....	2 months.	5 months.	6 months.
	<i>M</i> 2.....	7 to 8 mos.	9 to 10 mos.	12 to 14 mos.
	<i>M</i> 3.....	17 months.	18 to 19 mos.	21 to 22 mos.

7. The question now arises as to what may be regarded as the cause of this early dentition in modern pigs. We know that our present method of feeding causes a rapid development of the whole body, including, of course, the head. As the teeth could not possibly grow without a corresponding growth of the jaws that produce them, we must conclude that the development of the skull is the primary cause or driving force in their development. Unconsciously the modern feeder has produced here some highly interesting facts, instructive to natural science at large. Hitherto zoologists have been of the opinion that the form of skull of a fixed species is unchangeable from generation to generation, we may say for thousands of years. This is correct as long as we think of individuals raised in the freedom of nature and under natural and similar circumstances. But domestication, with its forced feeding and breeding for various demands, has brought about

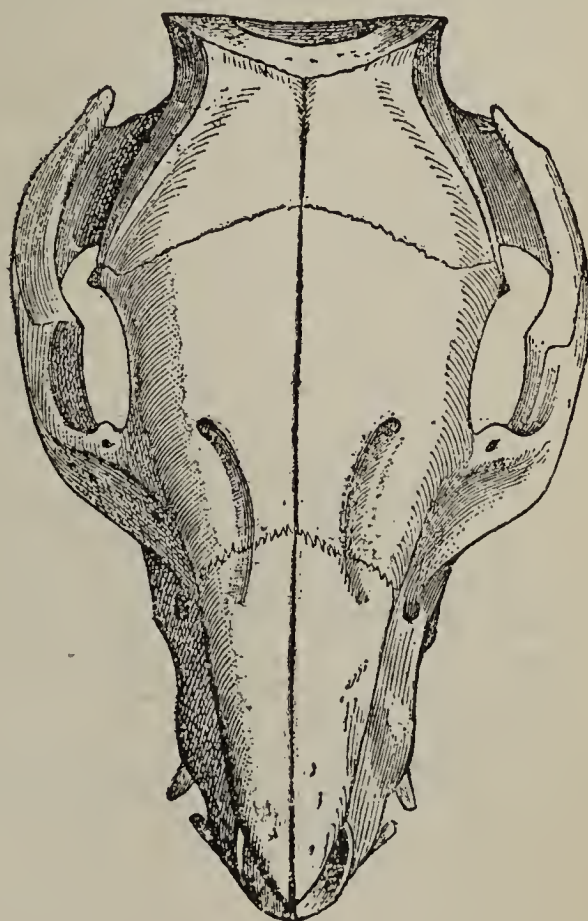
unexpected changes in many respects, and it is now evident that the form of skull does not rest merely upon heredity. Only a predisposition to a certain form of skull is transferable from parents to their offspring, but whether exactly the same form will be transmitted depends to a greater extent upon the nutrition, and but little less upon the employment of the muscles of the head and neck. It is not only important that the nourishment be abundant and well selected, but it is also necessary that the individual be in a healthy condition, and his digestive apparatus in such working order as to be able to utilize the offered food equally well. This is plainly seen by comparing skulls from animals which were healthy and growing vigorously, with those which received the same advantages of nutrition, but were suffering with a chronic disease. Continued weakness, caused either by disease or insufficient food, produces a long slender skull, while the skull from a strong pig shows a remarkable expansion in its latitude and altitude. The following reproductions, taken from originals in the agricultural museum at Berlin, will illustrate this point:



**Fig. III.**

Skull of a three months old pig, which died from tuberculosis,  $\frac{1}{2}$  natural size.

(After Nehring).



**Fig. IV.**

Skull of a two months old healthy and well fed pig,  $\frac{1}{2}$  natural size.

(After Nehring).

Besides the nutrition influence, a strong or weak muscular action plays an important part in the production of form. The pulling and pressure of muscles extensively used for certain purposes, especially those of the head and neck, will give the head a characteristic shape. Pigs which are prevented from rooting will acquire a short, high and rounded head, while those which are forced to root to secure a portion of their food will develop a long and slender form of head. If we force both experiments to the greatest degree possible, we shall produce those extremes which distinguish the wild pig from our improved races. That this is true is proven by the fact that when our domestic hogs are returned to absolute liberty, it will require but a few generations to reproduce the original skull of the wild pig. And, *vice versa*, we have called into existence from the primitive hog all those different representative types of our day, by careful and continued selection, gradual assortment, and particular attention to the desired qualities of form, size, etc. The striking difference between the skull of a primitive hog and a modern one is seen in the following illustrations :



**Fig. V.**

Skull of a full grown primitive Texas Boar,  
(Original).

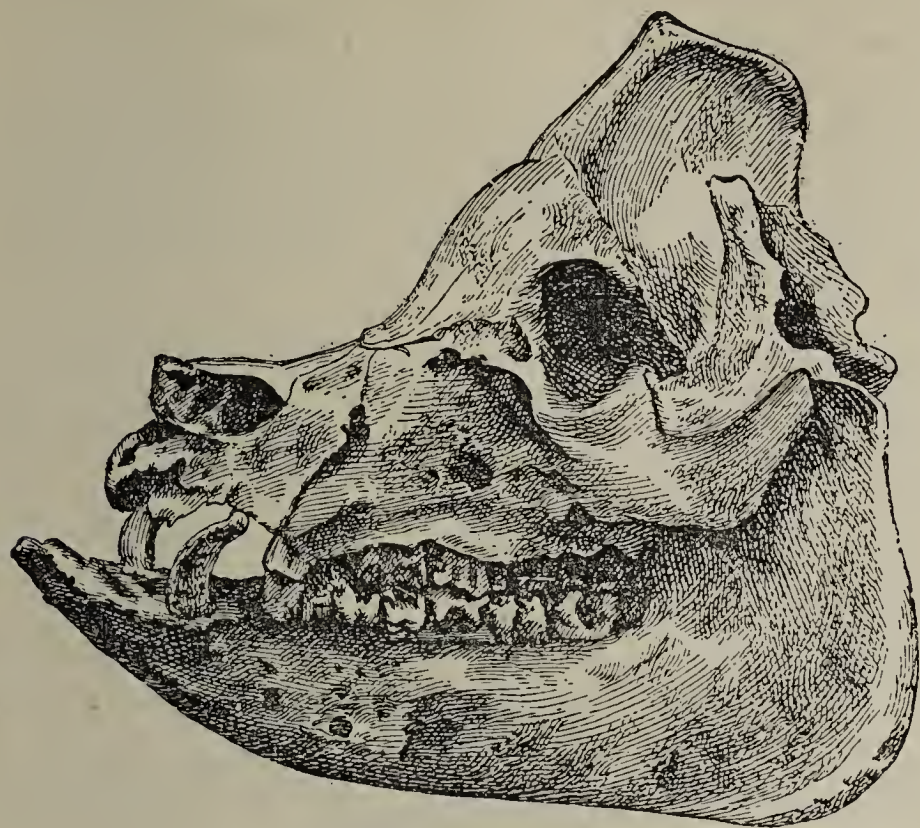


Fig. VI.

Skull of a full grown sow of the Small Yorkshire breed. (After Rhode).

To express this idea in figures, see following table :

HEAD.	Basilar Length.	Zygomatic Breadth.	Greatest Heighth.
Fig. V.....	13¼ inches.	5½ inches.	5¾ inches.
Head similar to Fig. VI. In possession of writer.	9¾ inches.	6¼ inches.	6½ inches.

The pig has, perhaps, the most elastic and changeable organization of any of our domestic animals. It also has the advantage of being able to digest all kinds of food as an omnivorous animal, and last, though not least, it multiplies more rapidly than any domestic animal, even the sheep. Therefore it has been at all times regarded, and properly, too, as the animal par excellence for experiments in breeding, and the pig is the best example of what men have accomplished in the production of animals.

Drawing, now, the conclusions from the above examinations, I shall summarize them in the following theses :

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- I. The order of succession of the teeth in our precocious pigs remains the same as in the primitive hog.
  - II. The times when the teeth appear are variable, according to the race, feeding, and health. The same breeds, raised under the same conditions, will show the same appearance.
  - III. The form of the skull depends upon nutrition, health and more or less employment of certain muscles of the head and neck.
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## THE DIARRHŒAS OR "SCOURS" OF NURSLINGS: COLTS, CALVES AND LAMBS.

BY G. ARCHIE STOCKWELL, M.D., F.Z.S., Member of New Sydenham Society (London).

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In adult domestic creatures, simple scouring being as a rule self-limited, is usually a matter of little moment, and non-productive of harm; the reverse, however, holds true of sucklings, more especially among ovines. The losses to breeders and agriculturists from this cause alone, in a single season, in some years assume frightful proportions, having on more than one occasion in the United States risen to forty per cent for lambs, and fifteen to twenty per cent for calves and colts. Further, it is computed that of the death rate of sucklings, seventy-five per cent. is attributable directly or indirectly to diarrhœa. Scours, too, appear to be upon the increase rather than otherwise, the cause being four-fold:

*First.*—Because of improvement in breeds and grades, including too close in-breeding, thereby engrafting more sensitive and acute nervous organizations, and fostering and perpetuating race weaknesses.—The most serious objection to in-breeding is the tendency to magnify the evil at the expense of the good in any class or race.

*Second.*—Owing to the lack of familiarity with the laws of hygiene, and knowledge of the physiological phenomena governing digestion, nutrition, etc.

*Third.*—Ignorance of predisposing causes, and the pathological changes induced; and

*Fourth.*—Imperfect understanding of therapeutics due to the second and third of these propositions, and of the chemico-physiological changes induced by both the disease and the remedies employed, with consequent improper care and treatment.

#### WHAT IS "SCOURING?"

Diarrhœa, from a general standpoint, may be considered as simple, inflammatory or acute, and organic: *Simple*, when the alvine evacuations are frequent, loose or liquid, without admixture of sanguineous products, and not dependent upon, or aggravated by, co-existent inflammation. *Inflammatory* or *Acute*, when due to excessive irritation leading to diffused inflammation accompanied by serous or sanguinolent exudation, threatening extension and exhaustion. *Organic*, when dependent upon morbid conditions of the *primæ viæ* and accompanied by manifest structural changes. This classification, which is somewhat arbitrary, is made as a matter of simplicity and convenience.

The diarrhœas of which I propose to treat are either simple or acute, and depend upon changes occurring in the economy of the stomach and small intestine; for in nursing creatures the larger bowel is never involved save perhaps through extension, being chiefly a convenience serving little purpose save as an escape for effete matters. Further, fluxes dependent upon changes in the colon and cœcum are rarely of local significance, but referable to structural degeneration and changes in other portions of the economy, and superimposed by inflammatory exudations of the lesser bowels—as in tuberculosis mesenterica, for instance.

Diarrhœa may arise from: *First.*—Indigestion and non-assimilation, proceeding later to exhaustion and debility. *Second.*—*a*—Absorption of poisonous and unhealthy gases (miasm), improper stabling, etc. *b*—Foul water supply furnished the parent. *c*—Microbes or ptomaines introduced from without, or spontaneously developed within the economy

of the animal itself through physiologico-chemical changes. *Third*.—Exposure to cold, damp, excessive heat. *Fourth*.—Mental agitation and reflex irritation. *Fifth*.—Tubercular disease involving the mesentery or other viscera. *Sixth*.—Excessive secretion of bile, or suppression of same from any cause.

Of these, only the *first*, *third* and *last* demand attention in connection with sucklings, since the others, occurring, are for the most part relative and symptomatic. The second and third also procure the first, hence for all practical purposes may be considered with the latter.

#### INDIGESTION.

This may be a product of either under-feeding or over-feeding, constituting improper food supply, and consequently, from a physiological standpoint, starvation. Continued indigestion in sucklings is especially apt to induce relaxation of the mucous coat of the intestines, and thus a diarrhoea that begins as a mere mucous discharge may speedily become serous, colliquative, and terminal.

#### FOOD.

The milk of the cow is approximately represented by 86.56 parts of water, and 13.44 of solids, the latter embracing 4.58 of casein and albumen, 4.03 of butter, 4.60 of sugar, and 0.73 of inorganic salts—sodium, potassium, magnesium, calcium, phosphorus, sulphur, iron and silica.

That of the mare has a larger proportion of solids, viz: 17.16 per cent., with an excess of butter (total 6.87) of 2.84, but considerably less casein and albumen, the total of both being but 1.64. Sugar and salts are in excess by 3.32 per cent., being in all 8.65 per cent.

In the ewe the lacteal secretion more nearly approaches that of the mare, there being but 0.47 of solids. This represents, practically, the same proportion of butter, and half the amount of sugar and salts, while that of casein and albumen (5.73) is in excess.

In the foregoing we find in the proportion of butter, casein, and albumen, physiological reasons for the more frequent

appearance of scours in lambs than calves, and in the latter than colts, as the sequel of interrupted or abnormal digestion. There are variations in the proportionate constituents of milk in the same grade and class of animals, however, and also, at times, in the same individual animal; and it is a well known fact that all exhibit a greater proportion of casein, butter, and albumen at night than in the morning. Again, the milk supply varies also with the condition, food supply, and surroundings of the mother, consequently it is not, or should not be, a matter of indifference to the breeder how his animals are fed, especially when they have nurslings at their sides. Brewers' grains, lush grass, refuse slops, and like foods that are employed because of their supposed ability to increase the supply of milk, and also on the score of frugality, are apt to prove the reverse of economical so far as the rearing of young animals is concerned; to the suckling it is virtually "offering a stone" instead of giving "bread." It should be remembered, moreover, that while the nutritive apparatus in these immature creatures excels in absorption, it is also deficient in digestion as compared with adults.

#### DIGESTION.

Since sucklings do not masticate nor ruminate, and exhibit but slight evidences of salivary secretion during feeding, the diastatic effect is not instantaneous, but, on the contrary, the flow of saliva is secondary to deglutition. This is the reason why immature creatures so frequently exhibit the phenomenon, after feeding, that in children is denominated *druling*.

Sucklings are scarcely at all dependent upon saliva to further the act of digestion, and those of ruminants make little demand upon the first, second and third stomachs. As soon as the rumen is excited to action by the act of swallowing, the food is quickly passed to the abomasum, when digestion differs in no essential from that of other herbivoræ, or even carnivoræ and omnivoræ.

Arrived at the stomach (abomasum in ruminants) the milk is thoroughly mixed with the gastric secretion, and by the action of the rennet (milk curdling ferment) the casein is co-

agulated, and the curd containing the fat globules floats in a clear fluid (the whey), which holds in solution the salts, sugar and albumen. As digestion progresses, the casein is turned into peptone, the fat is set free, and, being partially emulsified, gives a milky or turbid color to the whey. The stomach of the nursling contributes more to digestion proportionately than that of the adult, since, when the food is of proper quality, peptones are rarely discovered in the intestines, or the remnants thereof in the pylorus; presumably, also, nursling stomachs may also absorb nourishment directly, in some degree, since the cardiac and pyloric portions, for a brief period after birth, can contribute but very little to digestion, the peptic glands loosely resembling muciparous follicles.

Here an important consideration in connection with scouring presents itself, viz., the quantity of water contained in the food, which quantity in herbivorous creatures, as before noted, should average between eighty and ninety per cent. of the total milk ingested. Water is in especial demand for the formation of hydrochloric and lactic acid, and also pepsin, and is essential to the action of the latter in forming peptones; the effect of the gastric fluids upon the casein also requires a large quantity of water, consequently any circumstance that tends to concentrate the food by reduction of fluids, tends to interrupt digestion—the caseous matter, instead of parting with its oily constituents, passes on into the duodenum where this process is impossible, provoking irritation, abnormal stimulation, determination of circulation, ending in flux.\* Fat (butter), to be sure, is not digested in the stomach, but it is separated and prepared for the changes that take place when it encounters the bile and pancreatic products. Again, as

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\*Apropos of this, permit me to call attention to an experience of Dr. David Little, published in *The Transactions of the Medical Society of the State of New York* in 1884.

In an orphan asylum in Rochester where every previous summer had witnessed a number of deaths from diarrhoeal disease, he directed that infants should be fed at three-hour intervals during the day and have nothing at night. Water was allowed freely at all times.

This season passed without a fatal case of diarrhoeal disease! The moral is plain.

these last are but moderately efficient in sucklings, food too rich in fats, and that have not undergone proper changes in the stomach, prove too onerous for duodenal digestion, and secure the same pernicious effect. Indeed, it is a general observation of physiologists that derangements of nurslinghood more frequently arise from lack of sufficient water in the stomach (and consequently lack of pepsin, and hydrochloric and lactic acids) than from any other cause; and lactic acid derived from milk sugar is the essential requirement for the first stage of digestion.

When done with the food, the stomach expels into the duodenum the residue, viz., all starch that has not been converted into sugar, any cellulose that may be present, all parapeptones and dyspeptones resulting from proteinates, all fats, and some proportion, perhaps, of salts. These are now brought in contact with, first the biliary secretion, and second, the secretion of the pancreas. The remainder of the starch is thus converted into sugar, the fat is further emulsified that it may be absorbed by the intestinal villi, and the remaining albumen changed into soluble material. The two latter effects are never observed on zoötopic examination of sucklings that have succumbed to diarrhœa, hence it is evident that this lack of digestion is a prime factor in such conditions, and further, that the pancreas in young animals—in whom it is to a certain extent rudimentary—cannot be depended upon for the performance of its wonted function during an attack of scours.

The pancreas is functional and active only when the intestinal fluids are alkaline, and this alkaline reaction depends upon the presence of sodium phosphide; consequently, when through lack of soda the fluid becomes acid, the result is a diarrhœa that interferes with, or altogether arrests, the processes that tend to the formation of blood, bone and muscle, and general exhaustion follows more or less rapidly in accordance with the previous condition of the creature. Lambs naturally succumb quicker under such circumstances than calves and colts, owing to finer nervous organization, and consequent lack of nerve tone.

It is generally believed that the fat acids saponify with the alkalies of the duodenum. In such case, when the alkalies are sufficiently abundant to decompose fat, but not sufficient to the formation of soap, the result must needs be an excess of fatty acid, and when this occurs the alkaline intestinal fluids, especially the biliary secretion so essential to duodenal digestion, are neutralized; thus not only is the effect of the bile present destroyed, but in consequence thereof less bile is secreted. The biliary products are most essential to the absorption of chyle, but are not produced in sufficient quantities when the food is but incompletely transformed. Again, since the fæces almost always exhibit slight acid reaction, it is to be supposed that this is in consequence of the completion of the digestive act, and therefore not abnormal; but this acidity is increased or decreased from normal with the greatest facility in young creatures.

All fat is not absorbed in the act of digestion, since a portion leaves the intestines in the form of soap, another portion as free fat acid, and still another comparatively unchanged. In diarrhœa there is a large amount of fæces, the detritus of which is principally casein and fat, with more or less intestinal epithelium. In health, on the contrary, casein is never present, hence its detection is *prima facie* evidence of over- (*i. e.* too rich) feeding, or of interference with the digestive act by reason of an excess of free acid in the stomach. An important application of this fact is found in the succeeding paragraphs.

“As it is true that fat is not completely absorbed even under the most normal circumstances; as free fat acids are easily formed and accumulated; as they are formed in moderate quantities even in healthy nurslings; as it is known that a surplus is very apt to derange digestion and assimilation, and that it even prevents the normal secretion of either of the digestive fluids, gastric or duodenal; as there is usually a superabundance of fat in the normal food of sucklings, the conclusion is that the greatest care should be taken to ensure proper food supply through the parent.” (Jacobi.)

It is a simple matter to secure an excess of fat, but quite a different one, on the contrary, to secure too little, or to keep

within bounds. And for this reason, a favorite milch cow, prolific in cream and butter, may prove the worst possible brood animal, and unable to rear healthy, sturdy offspring. In such a case benefit is had by removing the calf to another cow, one that fulfills the required conditions, or, better yet, hand-feeding with diluted and peptonized milk; as morning's milk is much less abundant in casein than that of evening, restriction to the former often answers the required purpose.

#### ÆTIOLOGY.

Healthy sucklings possess a tendency to looseness of the bowels, their evacuations being normally fluid or semi-liquid. This obtains for two reasons—the condition of the intestinal tract, and the nature of the food. Again, peristalsis is extremely active in the young; the blood vessels and lymphatics are most permeable; the transformation of surface cells rapid; the inhibitory centers deficient in development; and, finally, there is greater reflex irritability.

All these, taken in connection with the fact that the action of the sphincter ani is far from being firm or powerful—that fæces are not retained in the rectum or colon sufficiently long to permit of any absorption of fluid constituents—tend to explain the predisposition to scours in the young. Atop of this concatenation, we may have the quantity of digestive fluids limited, or the supply of food ingested in excess, resulting in abnormal digestion, provoking fermentation, putrefaction, and irritation; the putrefaction of albuminoids develops an excess of ptomaines that, if absorbed, secure blood-poisoning, and nervous reflex irritation, irrespective of direct instant action upon the intestines. Bouchard declares that enough ptomaines are produced in twenty-four hours in the healthy animal, by the act of digestion, to procure its death, providing excretion was stopped and all absorbed; and T. Lauder Brunton asserts: "The alkaloids which are obtained from the decomposition of albumen are one of the chief sources of diarrhœas." The scours resultant upon "taking cold" are due merely to the locking up of normal secretions, interfering with digestion to the production of ptomaines; and the same

occurs from excessive heat, impure air and water supply, etc. All this is especially true of lambs, owing to their weaker nervous organization and consequent lack of tone, for no animals are more sensitive to sudden changes of temperature, the effects of low, damp, wet pastures, and overcrowding and improper shelter. Neither are the surroundings of the parent without influence; in which category may be enumerated exposure, overwork, improper shelter and food, and all causes that tend to modify or deteriorate the lacteal supply, or to divert nourishment from the lacteal apparatus to supply the general demands of the economy of the mother. This last is more provocative of scours in colts than is generally surmised, though over-heating of cows has long been held a prime factor in procuring the same malady in calves. True, most breeders and agriculturists assume a working mare ensures a more healthy foal, but this is true only within limits, and in so far as labor tends to restrain the excessive production of casein and fat in the milk. Too scanty lacteal supply, or milk that is greatly impoverished, forces the suckling to seek other foods, for the digestion of which its stomach and duodenum are illy fitted; profuse supply also tends to the same end if devoid of the proper amount of water.

#### PATHOLOGY.

Simple diarrhœas as a rule are not febrile maladies *per se*, (though by neglect they may become so) but rather partake of the nature of symptoms and warnings; they are efforts of Nature to relieve the economy of some evil in the way of excess, or poisonous or irritating material, and when such obtain, if not so profuse as to threaten exhaustion, are apt to be self-limited and beneficial. In such there are no pathological changes, the flux being of the crapulose variety, characterized by discharges every way normal save as to fluidity, requiring little or no treatment other than restriction and dilution of food.

Acute diarrhœas are alimentary, and may be also infectious. If of the former class, the dejections are yellow in color, small in amount, and contain much undigested matter—casein, fat

and fatty acids. This is the chylous diarrhœa of some authors, the sequel of gastric and duodenal disturbance and non-assimilation. Improperly cared for, especially in unhygienic surroundings, it is apt to progress into a dysenteric form, especially in young ovines, and also become infectious and perhaps epidemic. In the primary infectious form, the passages are of lighter yellow, even approaching a lemon or whitish hue, more numerous, are either acid or neutral in reaction, often fœtid, and contain large numbers of microbes, which may play an important part in the pathogeny of the trouble. Such scours readily assert themselves during weaning, or in creatures that are improperly and continuously hand-fed.

Another form is the diarrhœa lenteria, which may be—and often is—indicative of organic disease, probably adynamic or hereditary in origin; it is one of the characteristics of mesenteric tuberculosis, purpura, aphthæ neonatorum, etc., and is common among the offspring of creatures that are too closely inbred—an act calculated to perpetuate and intensify race weaknesses. The passages are white at first, and of some consistence, but later occasionally and temporarily stained with bile, and extremely liquid. When not due to organic causes, the trouble lies in an alteration of the secretion of the pancreas, and perhaps that of the liver as well: the food coagulated in the stomach is not transformed into peptones by the pancreas, and passes in an undigested state.

Green and bilious diarrhœas should be classed among alimentary, and are of more frequent appearance in colts than in either calves or lambs: they are attended with increased biliary secretion, and loose copious stools of bright yellow, or yellow-green, of decided acid reaction. Commonly arising from high temperature of surroundings and impure atmosphere, they usually appear during the first month succeeding birth, are not characterized by serous digestive derangement, and are especially prone to be self-limited, and consequently harmless.

Reflex diarrhœas also are observable, dependent upon taking cold, dentition, etc., in which the passages may be simply mucous, but sometimes assume a serous nature; are

yellow, and do not necessarily contain particles of undigested food.

Epizoötic scours are common, and in general outline resemble somewhat both the bilious and lenteria, lacking, however, the flow of bile peculiar to the former: frequently they are almost, or quite, dysenteric in character, are usually accompanied by muco-enteritis with intense congestion of the mucous-follicles, and general inflamed condition of duodenum and stomach; the latter on zootonic examination invariably contains curded milk. The passages are white, or white flecked with green, slightly acid; at first mucous mixed with intestinal epithelium, they speedily become serous, streaked with blood perhaps, or even decidedly sanguineous, and arise from poisoning due to specific bacilli developed epizootically through damp, sour pastures, or the phenomena incidental to taking cold from over-crowding and impure air.

It is by no means rare to find such scours complicated with other ailments such as pleuro-pneumonia, congestion of lungs, etc. They are, moreover, infectious, often truly epidemic, and generally rapidly fatal, especially in lambs, unless early cared for. The facts are, all infantile and nursling diarrhœas not dependent on secondary causes and organic lesions, even to cholera infantum, present no anatomical changes other than inflammation of the gastro-intestinal membrane.

In an established diarrhœa, one of sufficient moment to demand special therapeutic measures, there is morbid excitability and lowered tonicity of the mucous membrane, and a correspondingly rapid exudation of fluid, mucous or serous, into the alimentary tract, while the reflex excitement of the muscular coat of the bowel tends to free and perhaps forcible expulsion of the diarrhœal fluid mixed with the remnants of food imperfectly digested. If serous, the loss of fluid constituent of the circulation with its saline ingredients, provoke other morbid conditions; thus the secretions at large are diminished, perverted, or obstructed; the blood becomes thick so that oxygenation is but imperfectly accomplished; and the train of phenomena, primary and secondary, that characterize the malady, rapidly succeed. Now follow inflammatory

lesions and aphthæ of the intestines, and pyrexia: the muscular and nervous systems, the brain included, become exhausted by imperfect nutrition due to deficient capillary circulation dependent upon poisoning by retained secretions. Meantime the stomach and duodenum are incapable of performing their accustomed functions owing to determination to supply the loss entailed by the diarrhœa, and are unable to supply the fluids essential to nourishment and thus repair waste; and unless relief is obtained, collapse speedily follows to fatal ending. Zootomy in such cases reveals the stomach and duodenum pale and flabby, or as the seat of violent inflammation; and the ileum, jejunum, and cœcum denuded of epithelium, with hæmorrhagic infarctions and general low inflammatory condition; and when the dejections are clayey or have been persistently colorless, usually will be found obstruction of the pancreatic duct. Hydrobilirubin, the coloring matter of the fæces, depends upon the mutual reaction of the biliary and pancreatic fluids.

Again, from inanition and exhaustion, perhaps from ptomainic poisoning, the poor creature falls into a state of stupor or coma, exhibiting puffy under-eyelids, congested half-closed eyes, cold nose and legs, slow breathing, weak pulse, and the flanks and belly are retracted. This frequently occurs in innoxious scourings when the discharges are abruptly checked, and affords in such case indubitable evidence of toxic production, due to remedial interference.

*(To be continued).*

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## REPORTS OF CASES.

*“Careful observation makes a skillful practitioner, but his skill dies with him. By recording his observations he adds to the knowledge of his profession, and assists by his facts in building up the solid edifice of pathological science.”—VETERINARY RECORD.*

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### MUCOUS CYST IN A DOG.

BY WM. R. CLAUSEN, V.S., Waupaca, Wis.

August 31st a hound, property of Mr. Geo. Howlett of this city, was brought to me for treatment. The dog's eyes

were partially closed; the left eye more so than the right; conjunctiva congested; an abundant flow of tears trickling down the cheeks. Between the jaws, well back toward the neck, was noticed a large, fluctuating, non-inflammatory swelling; a ropy saliva was seen driveling from the mouth; inside the mouth between the tongue and left inferior maxilla was noticed a shining tumor, which increased in size when the exterior swelling was pressed upon. Deglutition was performed without inconvenience. Exploration with the aspirator revealed a substance resembling the white of an egg in the tumor. The sack was opened exteriorally by a free incision and about a pint of the white glary fluid was evacuated. The sack was then injected with argenti nitres grs. xx to water ℥i. Considerable swelling ensued, which gradually disappeared after a discharge of pus was established. The dog was brought to my office to-day and appears well. The eyes are bright and clear, and the swelling has disappeared. I suppose the tumor was one of the mucous cysts mentioned by Professor Williams on page 427 in his Principles and Practice of Veterinary Surgery.

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#### SUCCESSFUL OPERATION FOR THE CURE OF LARYNGISMUS PARALYTICUS OR ROARING IN THE HORSE.

By J. S. BUTLER, V.S., Piqua, Ohio.

At the request of Messrs. Dye & Stillwell, importers and breeders of Shire horses, Troy, Ohio, Dr. T. J. Pence of that place secured a roarer and wished me to operate on him for the cure of that disease as an experiment. Never having operated on such a case, or saw one operated upon, we thought it best to invite several veterinarians to be present and assist and witness the operation. The 12th of June was the day fixed upon for the operation, and the following veterinarians were present: Drs. W. R. Howe and W. Shaw, Dayton; J. Charlesworth, Springfield; W. A. Labron, Xenia; A. H. Logan, Bellefontaine; A. V. Derr, Sidney; T. Kerr, Urbana; T. J. Pence, Troy; J. S. Butler, Piqua.

I was assisted in the operation by Drs. Howe, Dayton and Charlesworth, Springfield; Drs. Kerr, Urbana, and Logan, Bellefontaine, administered the anæsthetic. The subject was an old gelding at least twenty years old, and in an emaciated condition. He had a chronic discharge from the nasal passages with considerable rattling in the head and trachea. The least exertion would cause very loud roaring and upon being severely exerted, the animal would stagger and nearly fall down if not stopped. The readers of this article will no doubt agree with the writer that this was not a very favorable subject for the operation.

The animal was thrown down and secured, and a suitable stage of anæsthesia was reached in about ten minutes. The hair was clipped as closely as possible over the region of the larynx, the skin was sponged with a solution of hydrarg bi. chlor., then an incision about five inches in length was made in the median line through the skin and muscles, exposing the larynx and trachea. The hemorrhage was controlled by cold water sponging and torsion of some small vessels. When the hemorrhage had entirely ceased the larynx was opened, including the first two rings of the trachea. Considerable mucus mixed with pus escaped from the wound, coming up from the trachea and bronchi.

The true cause of roaring in this case was fully demonstrated, as the left arytenoid cartilage was perfectly immovable, and the muscles of the same side were plainly atrophied, while the right arytenoid and the muscles were in a normal condition and expanded and contracted at each respiratory act. The left vocal cord was severed from its anterior attachment and it, with the arytenoid cartilage, was entirely removed. All partially detached pieces of tissue and shreds of mucous membrane were taken away by the means of curved shears. As the hemorrhage was slight, it was not thought necessary to pack the trachea. What hemorrhage there was was controlled by cold water, antiseptically treated with hydrarg. bi chlor., and applied with small silk sponges attached to the end of pieces of whalebone. The wound

was left open, as advised by Dr. Fleming, and the operation throughout was conducted as near as possible to his description of the operation in his work just out. After the animal had sufficiently recovered from the anæsthetic he was allowed to rise and walk back to the barn.

A thin piece of gauze was tied around the neck, covering the wound, and kept wet with the antiseptic solution and a little of the solution was injected in the wound. No food or water was allowed for thirty-six hours, when a few swallows of water and some bran and oatmeal gruel was given him, which he swallowed without much difficulty. The throat was dressed antiseptically twice a day, and the diet was confined to gruel for several days, when a little grass was allowed.

On the ninth day after the operation Dr. Pence and I threw the animal again and examined the interior of the larynx and wound. We found it in good condition, except in two or three places the granulations were rather profuse. These we touched with a solution of argenti nitras and continued the former treatment for four weeks, when the wound was about healed. Then a run of seventy-five yards was given him without producing any roaring.

A few days afterward, the wound having healed, the animal was turned out on grass, when the former owner one day, having a curiosity to know what condition he was in, went to the pasture without our knowledge, got on his back and galloped him all over the field, giving him a severe test, but without producing any roaring.

On July 24th, about six weeks after the operation, Drs. Pence of Troy and Charlesworth of Springfield, together with the writer, went to the pasture and tested him thoroughly by running him up hill and in every other way we could, but without producing any roaring. The respirations were somewhat harsh, which was unquestionably due to chronic thickening of the nasal and tracheal mucous membranes.

## ELIXIR OF LIFE.

By D. C. ASHLEY, D.V.S., New Bedford, Mass.

Standing beneath the cool, welcome shade  
 Of the wide-spreading boughs of an old oak tree,  
 An old horse and cow were awaiting the spade,  
 In the grave diggers' hands that would soon set them free.  
 And while they were nibbling and talking together,  
 Of the trials, and hardships, and trouble they'd seen,  
 I overheard their sad tales of sorrow,  
 And wondered if, really, such things had been.  
 Says the horse to the cow, "My fate has been hard,  
 For all of my labors, with little to eat.  
 They have strained all my tendons, and spavined my hocks,  
 I've been traded around, and cruelly beat."  
 "Ah! yes," says the cow, "but pray think of me,  
 When suffering with fever and rheumatics so sore,  
 They would call the empiric, who with a wise look,  
 Split the end of my tail, and my horns he did bore.  
 And when sore afflicted with coughs, colds or pains,  
 Such nauseous nostrums, that God only knows,  
 Why *I* am alive to tell you the tale,  
 And have not been given as food for the crows."  
 "Yes, true," says the horse, "and when I've come in,  
 From a long, tedious drive, heated, hungry and tired,  
 They have fed me with slops, and with colic I'd swell.  
 Then they sent for this quack, that our master admired,  
 Put a boy on my back, and run me for miles;  
 Then two men with a rail, to rub would begin,  
 String up my neck, and pour down two quarts  
 Of the strongest black pepper, and vilest of gin."  
 "But stop," says the cow, "there will soon be an end,  
 Of all of our hardships, our troubles and strife,  
 For as sure as we live, here comes Doctor Brown-Sequard,  
 With an injection for each, of *elixir of life*."

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## SOCIETY MEETINGS.

### IOWA STATE VETERINARY MEDICAL ASSOCIATION.

The second annual meeting of the Iowa State Veterinary Medical Association was held in the parlors of the new Savery House, Des Moines, September 3d and 4th.

The following members were in attendance: S. Stewart, Council Bluffs; Geo. J. Howell, Des Moines; Geo. A. Scott, Independence; Geo. A. Johnson, Odebolt; L. G. Patly, Webster City; E. P. Niles, Newton; E. E. Sayers, Al-

gona; M. E. Johnson, Red Oak; Joshua Miller, Ottumwa; A. B. Morse, Des Moines; R. P. Thurtle, Des Moines, and Tait Butler, Davenport.

The following members of the profession were also present as visitors: Drs. F. S. Billings, A. H. King, S. H. Johnson, E. S. Johnston, L. A. Thomas, Hugh Ovens, A. S. Barnes, G. C. Williams, J. W. Scott, J. A. Lawson, Alex. Plummer, J. D. Inger, G. L. Buffington, F. W. Ainsworth, E. Besser, W. S. Igo, T. A. Bown, R. C. Sayers, Fred Edwards and W. H. Sweet.

Routine business occupied most of the morning session, while the afternoon was spent in visiting the State Fair, but the evening session was opened by President Stewarts' annual address, in which was carefully reviewed the progress of veterinary science, especially in the line of literature. The absence of any statistics on the subject of the hereditary transmission of disease was noted, and the appointment of a committee for such work recommended. The idea of making an effort to organize a weekly veterinary journal in the West was also suggested.

The discussion which followed, and in which most of the members participated, resulted in the Association accepting the suggestion of the President in regard to the collection of statistics, and appointing the committee recommended. The members of that committee are, S. Stewart, A. B. Morse and Geo. A. Scott.

Dr. Joshua Miller, of Ottumwa, read an excellent practical paper on certain diseases of the heart, in which he described in a clear and pleasing manner his clinical observations. This paper was also fully discussed by several of the members present.

Dr. Tait Butler, of Davenport, addressed the society on the subject of surgery, especially criticising the neglect of the subject by the veterinary colleges of the continent. He also briefly described his method of castration, especially that of cryptorchids.

During the morning session of September 4th, the following gentlemen were elected members of the Association: S. H. Johnson, V.S., Carroll; G. M. Dunn, V.S., Cherokee; L. A. Thomas, D.V.S., Atlantic; J. T. Kennedy, V.S., West Union; Hugh Ovens, V.S., Hull; A. S. Barnes, V.S., Maquoketa; G. C. Williams, V.S., DeWitt; H. M. Rowe, V.S., Clinton; E. S. Johnston, D.V.S., Morning Sun; J. W. Scott, V.S., Manchester; J. A. Lawson, V.S., Winterset; Alexander Plummer, D.V.S., Cedar Falls; J. D. Inger, V.S., Strawberry Point; John Tillie, D.V.M., Muscatine; G. L. Buffington, D.V.M., Mt. Pleasant; F. W. Ainsworth, D.V.M., Brush Creek; E. Besser, D.V.M., Harper; W. S. Igo, D.V.M., Indianola; T. A. Bown, D.V.S., Chariton; R. C. Sayers, D.V.M., Fairfield; Gerald E. Griffin, D.V.S., Dubuque; J. E. King, V.S., Anamosa.

The question of legislation was suggested and to bring the matter before the society, it was moved by Dr. Tait Butler, and seconded by Dr. Geo. A. Scott, that a committee be appointed to canvass the members of the profession throughout the State, and ascertain their views as to what is needed in the matter of legislation and report the same, together with the most desirable means for securing such legislation, at the next meeting of the Association. After considerable discussion the motion was carried and the following gentlemen appointed as that committee: L. A. Thomas, G. C. Williams and G. A. Johnson.

The following officers were elected for the ensuing year: President, Tait Butler, Davenport; 1st Vice-President, E. P. Niles, Newton; 2d Vice-President, Joshua Miller, Ottumwa; Secretary and Treasurer, S. Stewart, Council Bluffs; Board of Censors, Geo. A. Scott, Independence; L. E. Sayers, Algona; M. E. Johnson, Red Oak.

At the evening session Dr. G. A. Johnson of Odebolt, read an interesting paper on rheumatism, in which he described a peculiar form of the disease affecting horses' feet, and which he termed lamellar rheumatism. A discussion of considerable length followed the reading of the paper. At the request of the President, Dr. A. H. King, of the Ontario Veterinary College, who was present, addressed the Association on the subject of "Practical Surgery as taught in our Veterinary Colleges."

Dr. F. S. Billings, of the Chicago Veterinary College, who was also present, addressed the society on the subject of Pathology.

Dr. S. Stewart offered the following resolutions, which were unanimously adopted:

*Resolved*, That Drs. Billings and King be tendered a vote of thanks for their addresses before the society.

*Resolved*, That Dr. Thomas, of Atlantic, be tendered a vote of thanks for giving a clinical demonstration of rapid anæsthesia with the Carlyle chloroform muzzle.

*Resolved*, That Dr. Tait Butler, of Davenport, be tendered a vote of thanks for his clinical demonstration of ridgling castration and operation for fistulous withers.

*Resolved*, That Drs. Morse and Howell, of Des Moines, be tendered a vote of thanks for furnishing material and place for the clinical demonstrations.

It is only two years since the present Iowa State Veterinary Medical Association was organized, but it already has a membership of forty-five regularly graduated veterinarians, which is fully seventy-five per cent. of the qualified men in the State.

Iowa veterinarians seem to fully appreciate the necessity of such an organization, and are proud of the fact that, in point of thorough organization and activity of its membership, it is second to no State Association in the Union.

The next annual meeting will be held at Des Moines during the winter of 1890-'91.

TAIT BUTLER, *Secretary*,

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#### AMERICAN PUBLIC HEALTH ASSOCIATION, BROOKLYN.

The seventeenth annual meeting of this Association will be held in the Hall of the Brooklyn Institute, Washington and Concord Streets, October 22d, 23d, 24th and 25th. Addresses of welcome will be delivered by Hon. Alfred C. Chapin, Mayor, on behalf of the city, and by Alexander Hutchins, M.D., on behalf of the medical profession.

The following topics have been selected for consideration at the meeting:

1. The Causes and Prevention of Infant Mortality.
2. Railway Sanitation. (a) Heating and ventilation of railway passenger coaches. (b) Water-supply, water-closets, etc. (c) Carrying passengers infected with communicable diseases.

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3. Steamship Sanitation.
  4. Methods of Scientific Cooking.
  5. Yellow Fever. (a) The unprotected avenues through which yellow fever is liable to be brought into the United States. (b) The sanitary requirements necessary to render a town or city proof against an epidemic of yellow fever. (c) The course to be taken by local health authorities upon the outbreak of yellow fever.
  6. The Prevention and Restriction of Tuberculosis in Man.
  7. Methods of Prevention of Diphtheria, with Results of such Methods.
  8. How far should Health Authorities be Permitted to apply known Preventive Measures for the Control of Diphtheria.
  9. Compulsory Vaccination.
  10. Sanitation of Asylums, Prisons, Jails and other Eleemosynary Institutions.

There will be an exhibition of sanitary goods and appliances in another large hall close by.

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## OBITUARY.

### JAMES BRODIE, V.S.

On the 17th August at Canon City, Colorado, occurred the death of Jas. Brodie, V.S., at the age of 32.

Dr. Brodie was a native of Canada, and graduated from the Montreal Veterinary College in 1883 at the head of his class, and immediately thereafter became junior partner of the firm of Williams & Brodie, of Bloomington, Ill.

In the fall of 1884 he accepted the position of veterinarian to the Hawaiian Government and removed to Honolulu, H. I. where he promptly made his influence felt by his energetic and judicious action in the control and extirpation of glanders, which was causing fearful ravages among the horses and mules of the little kingdom at the time of his arrival.

After a comparatively brief residence in Honolulu it was found that tuberculosis had fastened itself upon him and in 1887 he found it necessary to quit the Hawaiian Islands, and after a fruitless search for health in California and Colorado, finally succumbed to the dread disease. His brief residence in Illinois gave but little opportunity for many to learn of his worth. To his few acquaintances he was known as a genial, noble-hearted gentleman, an earnest and skillful veterinarian, and, had he lived, would undoubtedly have attained an enviable position in his profession.

W. L. W.

## CORRESPONDENCE.

## ARMY VETERINARIANS.

*Editor Review :*

Since the publication of my letter on the V. S. in the U. S. Army in the September issue of the REVIEW, letters of encouragement have poured in upon me at such a rate that it is impossible for me to answer each one individually. The interest taken in the subject by the profession has exceeded my expectations and their promises of assistance have been so sincere that it is without a fear for the result that I now place my bill before the public. To the uninitiated there may seem to be a lot of superfluous material attached to the "act," and for the information of these I will endeavor to herewith furnish a key. The Veterinary Surgeon General, with headquarters in Washington, will be at the head of the corps and will be assisted by the Assistant Veterinary Surgeon General. Six Inspecting Veterinarians, to be assigned respectively to the headquarters of each of the military departments, with one Inspecting Veterinarian to act as purveyor and disbursing officer. Ten veterinarians, to be assigned one to each of the ten cavalry regiments, the assistant veterinarians to be assigned as provided. Section eight provides for the non-graduates who are now in the army and who have spent the best part of their lives in the service of the United States. I think that it is only right that the two most prominent positions should be filled without examination, for the reason that in these positions we require men noted most for their executive ability and thoroughness.

I take this opportunity of thanking all of you who have written me words of encouragement in this connection and only ask that you will stand by the bill for the honor and advancement of the veterinary profession.

GERALD E. GRIFFIN, D.V.S.

DUBUQUA, IOWA, Sept. 16th, 1889.

## ELIXIR OF LIFE.

*Editor American Veterinary Review:*

DEAR SIR.—Since the Brown-Sequard “Elixir of Life” has so electrified the American people that the foremost physicians in the land have taken hold of it for experimentation, and have even this early accredited the fluid a certain degree of virtue as a tonico-nervius, I have considered myself justified in carrying the process of experimentation to beasts of burden.

As yet I cannot say that any definite physiological, toxicological or therapeutical results have been obtained from my operations.

It would seem, however, that the process of injection for purposes of nutrition would be as tenable in the animal as in the vegetable kingdom, where it has long since proved successful.

Absurd as “elixirization” must at first appear to us as medical men, we are forced by the prestige of its author to give it some consideration, and the more we experiment the more will we be forced to continue, so let us hurriedly give the process a “*trial for life* ;” extinguish it in the embryo, or credit it with its seeked-for “specific virtue,” and make it everlasting.

If any “specific virtue” is to be discovered for it, let some enterprising veterinarian harvest the meed of priority.

W. J. TORRANCE, V.S.

CLEVELAND, OHIO, Aug. 15th, 1889.

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## U. S. ARMY VETERINARY NOTES.

(By Kindness of J. A. WAUGH, V.S., U.S.A.)

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W. H. Going, M.R.C.V.S., tendered his resignation as Sen. V.S. 7th Cavalry, U. S. A., to take effect August 19th, 1889.

Frederick W. Hopkins, D.V.S., tendered his resignation as Jun. V.S. 7th Cavalry, U. S. A., to take effect August 31st 1889.

Daniel Lemay, V.S., formerly 1st Cavalry, U. S. A., and

lately employed as V. S. in the Q. M. Dept. at Fort Leavenworth, Kansas, has been appointed Sen. V.S. 7th Cavalry, U. S. A.

Benj. D. Pierce, V.S., M.R.C.V.S., tendered his resignation as V.S. 5th Cavalry, U. S. A., to take effect July 31st, 1889.

Gerald E. Russell, D.V.S., is preparing a new veterinary bill for U. S. army veterinary surgeons.

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## VETERINARY LEGISLATION.

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AN ACT To provide for the Organization of a Veterinary Corps and for the Rank and Pay of the Veterinarians of the United States Army.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled:*

SECTION FIRST. That there shall be established as a part of the United States Army a Veterinary Corps which shall consist of one (1) Veterinary Surgeon General with the rank, allowances and pay of a Colonel of Cavalry. One (1) Assistant Veterinary Surgeon General with the rank, allowances and pay of a Lieutenant Colonel of Cavalry. Seven (7) Inspecting Veterinarians with the rank, allowances and pay of Majors of Cavalry. Ten (10) Veterinarians with the rank, allowances and pay of Captains of Cavalry and a number—not to exceed fifty (50)—Assistant Veterinarians with the rank, allowance and pay of First Lieutenants of Cavalry.

§ 2. The Veterinary Surgeon General shall be charged under the Secretary of War, with the administration duties of the Veterinary Corps.

§ 3. The Chief Veterinary Purveyor shall be the chief purchasing and disbursing officer of the Veterinary Corps. He shall have, under the direction of the Veterinary Surgeon General, the supervision of the purchase and distribution of the United States Army Veterinary Medical and Hospital supplies, and the purchase, inspection and condemnation of all public animals.

§ 4. Within three (3) months after the passage of this Act the President of the United States shall appoint the Veterinary Surgeon General and Assistant Veterinary Surgeon General, whom, with two Surgeons of the Medical Department United States Army, shall form a Veterinary Examining Board, with the duty to examine such candidates as shall present themselves for examination, and shall report and certify to the Honorable Secretary of War the names of seven (7) candidates who shall have passed the highest examination satisfactory to said board.

§ 5. Within one month after the receipt from said Veterinary Examining Board of the certificates of the seven (7) candidates who shall have passed the

highest satisfactory examination, the President of the United States shall appoint to the various positions immediately Junior to the Assistant Veterinary Surgeon General the said seven (7) candidates, to take rank according to the order of merit certified by said examining board.

§ 6. The Honorable Secretary of War shall thereafter appoint a Veterinary Medical Examining Board selected from the members of the Veterinary Corps to examine candidates for the position of Veterinarian and Assistant Veterinarian and for the promotion of Veterinarians and Assistant Veterinarians to such vacancies as may hereafter occur in the senior positions in the Veterinary Corps of the United States Army except that of Veterinary Surgeon General and Assistant Veterinary Surgeon General, which shall be filled by appointment and without examination.

§ 7. To each regiment of Cavalry there shall be assigned one (1) Veterinarian and one (1) Assistant Veterinarian. To each light Battery of Artillery one (1) Assistant Veterinarian. To the Cavalry School at Fort Leavenworth two (2) Assistant Veterinarians. To Jefferson Barracks two (2) Assistant Veterinarians, and to each military post or depot where the number of public animals exceed seventy-four (74), one (1) Assistant Veterinarian.

§ 8. Veterinary Surgeons in the service of the United States Army as such at the passage of this Act (whether graduates of Veterinary Medicine or not) shall be appointed Assistant Veterinarians without examination on recommendation of their Regimental Commanders.

§ 9. Veterinary Surgeons in the service of the United States Army as such at the passage of this Act, who having served twenty or more years in the capacity of Veterinary Surgeon or otherwise in the United States Army, shall be entitled (after his appointment to the Veterinary Corps) to all the allowances (for length of service as Veterinary Surgeon or otherwise in the service of the United States Army) of the rank of like grade in other branches of the service.

§ 10. No person shall be appointed as Veterinary Surgeon General, Assistant Veterinary Surgeon General, Inspecting Veterinarian, Veterinarian or Assistant Veterinarian in the Veterinary Corps United States Army unless he be a regular graduate of a legally chartered or incorporated Veterinary College or University, and shall have passed (except in the case of the Veterinary Surgeon General) a satisfactory examination before the Examining Board hereinbefore provided, except as provided for in Section VIII. of this bill.

§ 11. No person shall be eligible for appointment to any position in the Veterinary Corps United States Army unless he has had at least one year's experience as a practitioner of veterinary medicine between the dates of his graduation as a Veterinarian and that of his application for examination for appointment to said Veterinary Corps, and no person over thirty-five (35) years of age shall in any case be appointed to any position in said Veterinary Corps except in the case of the Veterinary Surgeon General, Assistant Veterinary Surgeon General and those provided for in Section VIII. of this bill.

§ 12. This Act shall take effect immediately.

# AMERICAN VETERINARY REVIEW,

## NOVEMBER, 1889.

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### EDITORIAL.

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IMPORTANT VETERINARY EVENTS IN SEPTEMBER.—FIFTH INTERNATIONAL VETERINARY CONGRESS.—The bureau and the officers elected—regulation of the work—subjects discussed—tuberculosis—report of Mr. Arloing—seven important resolutions adopted—pleuro-pneumonia—Messrs. Degive's and Butel's excellent reports—resolutions unanimously passed—other questions also treated, discussed and adopted—the inauguration of the Bouley Statue at Alfort—the grand display of love and respect to the great veterinarian, the author, the teacher, and the friend of all—banquet at the Eiffel tower. THE VETERINARY PROFESSION AT THE EXHIBITION.—The French schools well represented—rivalry of Alfort, Lyons and Toulouse in their special shows—not enough botany, but too much horse-shoeing—the private exhibitions—our duties in 1892—our remembrance of 1876 and of Dr. Gadsden's handsome show cases—collection of the French veterinary journals—each school has its special organ. UNITED STATES VETERINARY MEDICAL ASSOCIATION.—Though less brilliant, not the less useful—our absence prevents our personal remarks—review and criticism by N. N. S.

Having laid before our readers, in our last number, our motives for postponing the consideration of the important veterinary events by which the records for the month of September have been distinguished, we propose to appropriate a portion of space in our present issue to a review of the work accomplished during that period. We give our attention first to the proceedings of the *Fifth International Veterinary Congress* whose sessions were held in Paris daily for a week, commencing on the 2d ultimo.

The Committee on Organization had previously labored long and assiduously to excite an interest in the coming event, and the attention of the veterinary world had been largely attracted to the occasion.

The sessions of the Congress were held in the halls of the Société de Géographie, where the members were greeted by a few words of welcome by the President of the Committee on Organization, M. Chauveau. The Secretary, Director Nocard, of Alfort, responded that 650 veterinarians had accepted their appointments as delegates to the Congress, including 178 from foreign lands, apportioned as follows: Belgium, 48; Switzerland, 46; Spain, 27; England, 8; Italy, 7; Roumania, 7; Holland, 6; Russia, 5; Denmark, 4; Austria and Hungary, 3; the United States, 4; Egypt, 3; Luxembourg, 2; Portugal, 2; Japan, 2; Germany, 2; Alsace, 1; Sweden, 1; and 1 from Norway.

This was followed by the nomination of several honorary members and of M. Pasteur, Professor Roll, of Vienna and M. Tisseraud, of the Ministry of Agriculture, as honorary Presidents.

The election of permanent officers succeeded, resulting in the choice, by a unanimous vote, of M. Chauveau as President, and M. Nocard as Secretary, with twelve Vice-Presidents, selected from amongst the foreign veterinarians, and consisting of Messrs. Degive of Brussels, Jacops of Belgium, Berdez and Potterat of Switzerland, Bang of Denmark, Perroncito of Italy, Thomassen of Holland, Semmer of Russia, Fleming of England, Liautard of the United States, Lopez Martinez of Spain, and Fisher of Luxembourg.

The official staff was completed by the selection of ten Secretaries, to record the work of the Congress.

The arrangements for conducting the business of the meeting were excellently conceived, and with perhaps the single drawback of a somewhat limited attendance, attributable to the lack of representatives from Germany, the Congress of 1889 was a most gratifying and memorable event, and cannot but be largely conducive to the progress and the influence of practical veterinary science.

The subjects chosen for discussion were of an eminently important and utilitarian character, and the results which were reached must ultimately, if not immediately, commend themselves to public acceptance and governmental sanction, whenever duly considered.

The subject of tuberculosis, which was reported by M. Arloing, was brought to a close by the adoption, in substance, of the following resolutions,\*

1.—The laws of every country should fix the status of animal tuberculosis by legislative enactment amongst contagious diseases, and subject it to the control of sanitary law.

2.—The use, both by mankind and animals, of the flesh of tuberculous animals, whether mammalia or birds, as food, whatever may be the degree of tuberculosis, and whatever may be the apparent qualities of the meat, should be interdicted.

3.—Owners of animals, whether of the bovine or porcine species, which are destroyed on account of their infection by tuberculosis, are entitled to indemnity:

4.—The use of the skins and horny products of tuberculous bovines may be allowed, after disinfection.

5.—The use of the milk should be prohibited.

6.—Cow dairies should be at all times subject to proper legal inspection.

7.—The precaution of boiling milk obtained from unknown sources, when used for food, should be recommended by all possible means.

The consideration of this topic had been made one of the principal objects of the meeting, and it was freely discussed.†

The subject of pleuro-pneumonia occupied the fifth day of the Congress, with Professor Degive and M. Butel as reporters. The occasion was improved by Professor Arloing, by the introduction of an exhibit of the microbe of contagious pleuro-pneumonia, the true nature of which he has established

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\*A full translation of this report has been made, a portion of which will be found on another page of the present number of the REVIEW.

†The minutes of the day occupied by this discussion, and which we only saw in print after the adjournment of the Congress, and therefore were unable to alter, attributes to us a statement which we hasten to correct. Either we committed a great *lapsus linguæ*, or we were misunderstood, or the boy in the type room is responsible for the mischief, when the report of a mortality of 500,000 to 600,000 from tuberculosis in the United States was laid to our charge. The mortality of 100,000 to 135,000 is amply sufficient, without putting it at the frightful rate erroneously given.

by repeated experiments. A discovery of great value has thus been authenticated and given to the public.

As a result of a free and full discussion six resolutions to the following effect were adopted :

1.—The general slaughter of diseased and contaminated animals constitutes the only effectual means for the extinction of contagious pleuro-pneumonia. This principle ought everywhere to form the basis of legislation on the subject, wherever the disease exists.

2.—As an auxiliary and preparatory expedient, before resorting to the extreme measure of a general slaughter, the "inoculation of precaution" (so called) may be prescribed in infected localities where the disease is common and the bovine population large and often changed.

3.—Inoculation of necessity should be enforced whenever, for any reason, the slaughter of contaminated animals is postponed.

4.—The sale of animals thus inoculated should be prohibited, except to butchers, and for the purpose of slaughter.

5.—No new stock should be admitted into cow sheds or barns in which diseased animals have been kept, without a previous thorough disinfection of the premises.

6.—Owners of animals destroyed because of pleuro-pneumonia, or which may have died from legalized inoculation, are entitled to a reasonable indemnity.

Other questions before the Congress, such as "the indemnities in cases of slaughter, and the means of insuring their payment ;" "the inspection of meats ;" and "the organization of the international sanitary service" also received a good share of attention, and after a whole week of faithful labor the Congress adjourned for four years, to meet again at Berne, Switzerland.

Among the interesting incidents of the Congress was the inauguration of the Bouley Statue, at Alfort. This was an occasion of great interest, and the attendant ceremonies were of the most imposing and impressive order. A large number of veterinarians, professional men, members of the Congress, and civil and military representatives of the veterinary profes-

sion were present and participated in the observances. A large tribune had been erected in front of the statue, and furnished seats for numerous foreign guests and members of the Congress, with their wives. The assembly was addressed by the Minister of Agriculture, and by Messrs. Chauveau, Leblanc, Tisseraud, Nocard and Degive, in honor of their departed collaborateur, and eulogized the memory of the great veterinarian, who received ample, but not unmerited recognition in the presence of the admirable "counterfeit presentment" so correctly and so beautifully wrought by the artistic hand of the sculptor, Mr. Allouard, who received on that occasion a well deserved reward of his genius and skill in the decoration of the Legion of Honor.

The event of the last day of the Congress was a banquet, tendered by the French veterinarians to their foreign colleagues. The feast was spread on the first floor of the Eiffel Tower, and a more fraternal and congenial interchange than this has perhaps never been enjoyed on a similar occasion.

THE VETERINARY PROFESSION AT THE PARIS EXHIBITION. —Among the more remarkable objects exhibited at the French Exposition are the collections of the French veterinary schools. It is a most striking testimony of their advance in all that relates to the progress of veterinary science, skill and accomplishment. The three schools are all well represented, and there are no deficiencies, except possibly in the contributions from Toulouse, which by reason of its greater distance from Paris was at somewhat of a disadvantage, and has scarcely done itself justice, while Alfort was simply grand.

This exhibition of veterinarian progress was located in the centre of the Agricultural Galleries, a position which renders more evident the existence of a hiatus of some importance in the veterinary sections, occasioned by the absence of all that relates to botany, vegetable physiology and materia medica. By contrast, however, another branch of veterinary science was rather oppressively demonstrated. We refer to the mass and the number of shoes taken from the museums of the schools, or from private collections, and which were certainly redundantly displayed. But, with these exceptions, veterinar-

ians may feel justly proud of the place they filled in the world's great feast of peace spread out in Paris.

The department of anatomy was well represented, Alfort showing beautiful preparations of brains, and Lyons a remarkable collection of plaster casts, handsomely and artistically painted, while Toulouse exhibited a most delicate piece of work in a separated skull, showing the dissociation of the bones of the head, according to the theory of the vertebræ of Mr. Lafosse.

In physiology, Director Arloing, of Lyons, had an apparatus for the study of respiration; M. Chauveau his universal register for physiological experiments; and Mr. Barrier, of Alfort, an apparatus for registering the peculiarities and actions of the organs of locomotion.

The departments of theory and practice exhibited large numbers of fractured bones, of exostoses and of tumors of all kinds. Alfort exhibited a mounted dog, illustrating a case of osteoporosis of the four extremities.

The department of sanitary medicine had a good exhibition. Toulouse showed a series of artistic illustrations of specific lesions represented in water color drawings of remarkable truthfulness; Director Nocard has a show case of the cultures of microbes, of which he has made a special study, including contagious mammitis, farcy of cattle, and tuberculosis. Lyons exhibited water colors of specimens, and a large atlas illustrating the various forms of vaccination.

M. Railliet contributes a large collection of all the parasites of the domestic animals.

Zootechnie is also well represented. Each school had a collection of the journals which they publish, for in Europe there is, strictly speaking, no national veterinary journal published, the *Recueil* being the organ of Alfort; the *Journal of Zootechnie* that of Lyons; and the *Veterinary Review* that of Toulouse.

Besides these exhibitions by the schools were a number of private contributions, among which were shown apparatus and beds for animals, horses or dogs undergoing operations; feeding bottles; new shoes again; and instruments for the

surgery of dogs, of cats and even of birds, and so on to the end.

The participation of the veterinary profession in the International Exhibition of Paris will, we hope, convey an important lesson to our colleagues on this side of the water, which should be well conned before the time when the United States will hold their great national centennial show in 1892. As early as the last Centennial in Philadelphia, a few gentlemen together with the general government, had given evidence of an improved recognition of the standing of the profession; and many of us still remember the beautiful show cases which were so well furnished and arranged by our friend Dr. Gadsden. But many years have passed since 1876, many improvements have been made since then, and we may all feel assured that the American veterinary exhibition of 1892 will be as creditable and comprehensive, when the brevity of the lifetime of American veterinary science is considered, as that which has been displayed in the halls of the Champ de Mars in Paris in 1889.

UNITED STATES VETERINARY MEDICAL ASSOCIATION.—While the important gathering which assumed to be the Congress of the veterinarians of the world were getting together in Paris, a convocation of brethren of a like calling in the New World were also assembling, as they have annually done for the past quarter of a century.

For once, as it has been our misfortune to be necessarily absent from this meeting, personally, we cannot, of ourselves, comment on the features and the character of this session, nor of the work it has accomplished. Instead of this, we shall present our readers with a criticism and review by one of the most active and the most impartial members of the Association, who kindly accepted the office of reporter, and contributes the enclosed article for the special benefit of our readers.

We also take this opportunity to publish an interesting review of the work of the Association, by Dr. Huidekoper, and a set of resolutions on tuberculosis, presented by Dr. L. McLean, the value and wisdom of which are confirmed and strengthened by the action of the late International Congress, elsewhere referred to.

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ORIGINAL ARTICLES.

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## TUBERCULOSIS.\*

BY M. ARLOING, Director of the Lyons Veterinary College.

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I.—TUBERCULOSIS CONSIDERED FROM THE POINT OF VIEW  
OF SANITARY POLICE.

For some time yet there will be discussion regarding the heredity of tuberculosis; one may ask whether the subjects descended from tuberculous parents are born *tuberculised* or more tuberculisable than others; but it is no longer possible to doubt the dangers to which tuberculous animals expose their neighbors and their progeny. Such animals discharge virus by the respiratory and digestive passages, and by the mammary secretion. This virus can infect healthy subjects by its introduction into their digestive apparatus with food or drink, or into their respiratory apparatus with the atmospheric air.

Experiments, several times repeated, and whose authors, known to all, merit our confidence, have placed these facts beyond all dispute.

Hence it is logical to take measures to oppose the propagation of tuberculosis by the tuberculous. The first is to class this malady among those which in every country are combated by statutes of sanitary police.

This measure figured under No. 3 among the resolutions presented by M. Lydtin to the International Congress at Brussels.

The Congress, being pressed for time, did not examine it. The members were more concerned with the relationship of tuberculosis to the alimentary hygiene of man than with contagion from animal to animal, and, by a deviation not uncommon in minds pressed and absorbed by a particular point of view, they did not perceive that measures concerning alimentary hygiene ought to be the corollary and not the premises of measures regarding contagion.

The question accordingly remained to be considered, and

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\*Translation of a paper contributed to the International Veterinary Congress Paris, 1889. Reprint from the Journal of Comparative Pathology.

it has engaged the attention of our *confreres* in every country.

It was specially examined in 1885 by the Second National Congress of French Veterinary Surgeons, established as a Sanitary Congress. After a very prolonged discussion it was decided by 28 votes against 17 to demand from the government the inscription of tuberculosis among the diseases recognised by the Act of the 21st July, 1881, on the Sanitary Police of Contagious Maladies.

The French Government took this view into consideration, for on the 12th November, 1887, it added bovine tuberculosis to the contagious diseases, in the decree which rendered the Act of 21st July, 1881, on Sanitary Police, operative in Algeria. Finally in another decree, dated the 28th July, 1888, it classed this disease with those recognised by the sanitary law on French territory.

Consequently at the present time bovine tuberculosis is the object of repressive sanitary measures in France and Algeria.

The general dispositions of the law which prescribe to owners of animals attacked by a contagious disease, or to veterinary surgeons authorised to attend to them, to make the declaration, and which forbid their being exposed for sale, or removed without previous permission, are applicable to tuberculosis as to all the diseases officially reputed contagious. The administration has also indicated with detail the measures which it desires to oppose to tuberculosis. It is well that the Congress should know that these measures are not absolutely identical in France and in Algeria.

In Algeria, when tuberculosis is diagnosed, the Mayor or administrator of the commune issues a decree prescribing the slaughter of the animal affected; the flesh cannot be sold for consumption.

In France every animal recognised tuberculous is isolated and sequestered, and it cannot be removed except for slaughter, which is carried out under the surveillance of a sanitary veterinary surgeon. The consumption of the flesh of tuberculous animals is sometimes permitted under certain conditions which we shall examine later on.

It will doubtless be remarked that these measures, although

different, ought to entail the same result. A proprietor will not wish to maintain a tuberculous animal isolated and sequestered indefinitely ; and, since he cannot remove it except for slaughter, he will himself be brought promptly to demand that measure.

In Algeria, then, the administration imposes the slaughter of tuberculous animals, while in France it in a manner compels the owner to propose the slaughter of his animal.

The *modus faciendi* employed in Algeria can, strictly speaking, render legitimate a demand for compensation ; while, by the *modus* adopted in France, the administration may believe itself freed from all obligation to the proprietor.

Rigorously, this theory can be maintained, for a tuberculous animal is a subject dangerous to the property of others, and it is not permitted to any person to wittingly injure any one. If the animal that is the source of the injury does not disappear by the goodwill of the owner, society has the right to exact its destruction.

But a more conciliatory theory has often been sustained, and at Brussels even it was supported by M. Lydtin. There can be no doubt that in most cases the disease finds an entrance to a building without the knowledge of the proprietor, that he is himself the victim of preexisting contagion ; so that, in imposing upon him a sacrifice for the public good, it is well that society should charge itself with a part of the loss.

Moreover, the efficacy of the law requires that the owners of tuberculous animals should not have to run too much counter to their own interests in submitting to the obligation to report. The only means of diminishing their resistance is to establish the principle of compensation in the case of slaughter.

Nevertheless, it seems to us excessive to render the State alone responsible for a situation which, frequently, has been created by the carelessness of owners. It is to the principle of mutuality that recourse must be had—a principle which could be applied under the control of the State. It would be equally excessive to allow dishonest (*vireuse*) speculation to spoil the principle of compensation.

M. Lydtin has displayed great efforts to inform the Brussels Congress regarding the frequency of bovine tuberculosis. The inquiry to which he has devoted himself is very interesting. It is especially necessary to remember the figures which he has drawn up regarding the Grand Duchy of Baden, and those borrowed from Goring in Bavaria, for these refer to the whole of the animals in these countries.

Since phthisis prevails more particularly among animals aged from three to six years, it will be more frequent in the abattoirs than in the cattle sheds of the country.

In Bavaria, while the proportion of tuberculous subjects was raised to 12.5 per 1000 at the abattoir of Munich, it did not exceed 1.6 per cent over the whole territory.

In the Grand Duchy of Baden the proportion was 8 per 1000 among the animals slaughtered for consumption, and 2.2 per 1000 for the general bovine population of the whole country. M. Lydtin wishes to take into account the cases of tuberculosis that pass unperceived, and of those that are concealed, and he believes that 4.5 per 1000 may be taken as the figure which expresses the frequency of tuberculosis in the Grand Duchy.

The statistics drawn up in Bavaria, again, demonstrated that phthisis was very unequally distributed between different regions or districts.

We know that for some time a similar inquiry has been pursued in several European countries. It is therefore probable that the International Congress will witness some valuable information on this point.

As a matter of fact, in France the elements of a statistic are borrowed from the register of the abattoirs inspected by veterinary surgeons. The following are the figures that have come to our knowledge:—

At the abattoirs of Bordeaux, according to M. Baillet, the proportion of tuberculous cattle (of all degrees) is 2 per 1000.

At the slaughter houses of Rouen, according to M. Veysièrè, the proportion of tuberculous bovines has been, from July, 1884, to 1888, 1.43 per 1000; 15 cases annually in 10,500 animals. During the year 1888 there were discovered 23 cases of tuberculosis among 12,174 oxen, cows and bulls.

At Mantauban, according to M. Bayrou, in a period of  $6\frac{1}{2}$  years, in 15,483 cattle slaughtered there were noted 63 (4.07 per 1000) attacked with general tuberculosis. Those affected with local tuberculosis have not been counted. At Lyons, out of 50,000 oxen, there are encountered about 50 (1 per 1000) cases of tuberculosis.

At Paris, in 1882, out of 260,000 adult cattle there were seized only 11, and 684 others suffering from local tuberculosis were passed. The proportion, counting all the cases, is 2.60 per 1000. The statistics collected by M. Villain at the abattoirs of Villette and Grenelle give a proportion of 6 per 1000; out of 500,000 cattle slaughtered annually in the Parisian abattoirs there are thus 3,000 tuberculous in different degrees of the affection. Paris receives over 40 million kilogrammes of meat annually, yielded by about 100,000 animals; for this last series the proportion is certainly 10 per 1000.

At the abattoir of Lille the proportion of tuberculous adults has been 1.05 per 1000 in 1882 and 1883 (Vittu),

At the slaughter house of Melun, during the four years from 1884 to 1888, the proportion of tuberculous subjects has been 4.31 per 1000, in 5,766 animals (Barrier).

At Cambrai M. Cartier has observed during eight years 5 cases of tuberculosis in 1000 cattle slaughtered.

According to a note by M. Moret of Troyes, the statistics taken from 1st October, 1884, to 28th February, 1889, (4 years and 5 months) show that tuberculosis was observed in 4 oxen, 8 bulls and 299 cows (total, 311 cattle), out of 2,000 oxen and bulls and 21,000 cows (23,000 animals slaughtered), which gives a proportion of 14.5 per 1000. Specific tubercles have been observed on a single calf, which was 3 months old (44,000 slaughtered).

At Saint Etienne, out of 12,978 cattle which he had examined in 1888, M. Labully has ordered the total seizure of 25 tuberculous subjects and the partial seizure of 35 others, giving a proportion of 5 per 1000.

From these figures, it results that one may estimate the proportion of tuberculous subjects among the adult cattle of France at 5 per 1000.

It will doubtless be objected that our statistics are drawn from inspected abattoirs, and that it is a matter of public notoriety that the animals suspected of being affected with tuberculosis are kept away from these establishments.

That is true; but if the proportion of tuberculous subjects is greater among the animals slaughtered outside of the abattoirs, it is much lower in the general bovine population. We have seen previously the result of the observations made in the Duchy of Baden. It therefore seems to us reasonable to hold to the mean figure of 5 per 1000.

Let us calculate now the number of diseased subjects in the whole of France, admitting that the disease may be pretty uniformly spread over the territory.

According to the statistics of the Minister of Agriculture, there were on the farms of France, on the 31st December, 1887, 8,623,441 adult cattle. We may raise this number to 9,000,000 for the whole of France, in including the animals kept elsewhere than on the farms. If we admit a proportion of 5 tuberculous adults per 1000, we see that the number of animals affected with tuberculosis reaches 45,000.

The mean value of these animals being about 300 francs, the amount of compensation to be paid would attain to 9,000,000 or 6,750,000 francs, according as they were fixed at two-third or one-half of the price, if one succeeded in discovering immediately all the affected animals in order to compel their slaughter.

But it ought to be remembered that this sum will necessarily be spread over an indefinite number of occasions, and that it will every year undergo a gradual reduction.

We add some information regarding the other countries of Europe.

In England, according to Mr. Cope (Congress for the Study of Tuberculosis), the proportion of tuberculous cattle is from 1 to 26 per cent, according to the locality.

In Belgium, according to M. Van Hertsen (Congress for the Study of Tuberculosis), the proportion of tuberculous cows is about 4 per cent.

In Holland, M. Thomassen (Congress for the Study of

Tuberculosis) reports that the proportion of tuberculous cattle varies from 8.4 to 10.6 per 1000.

At the abattoir of Augsburg, the proportion of tuberculous cattle has been in 1887 3.62 per cent, and that of tuberculous calves 0.013 per cent.

It has been mentioned above that at the Congress of French Veterinary Surgeons in 1885, a minority did not vote for the immediate inscription of tuberculosis in the law regarding the sanitary police of contagious maladies. Impartiality lays upon us the duty, which is easy to discharge, of indicating the reasons that guided our honorable associates. Their timidity proceeded from the difficulty of diagnosing bovine tuberculosis.

There will be found in the Report of the International Congress at Brussels, at page 214 and the following, a review by M. Lydtin of the diagnostic signs of tuberculosis. He observed, in concluding, that veterinary surgeons have too often wrongly exaggerated the difficulties of diagnosis of this affection. The attentive breeder succeeds in putting out of his herd the tuberculous animals, and it appears to him (M. Lydtin) that the veterinarian, who is armed with more extensive theoretical knowledge and more numerous methods of investigation, may aspire to doing as well as the farmer.

It is true that the latter has his animals under his eye for a long time, and proceeds with deliberation, while the veterinary surgeon is required to give his diagnosis with certainty in a short period.

Nevertheless, we think with M. Lydtin, that these are not motives for discouragement, but reasons for thoroughly investigating the question and for perfecting our means of diagnosis. It has been so regarded by several of our associates, of whose works we proceed to give a *resumé*.

The lesions of tuberculosis may evolve in all the organic systems, but we have hardly to concern ourselves except with the thoracic and the abdominal tuberculosis, after which may be grouped tuberculosis of the lymphatic glands, superficial or deep, tuberculosis of the udder, and that of the bones.

To establish the diagnosis of the pectoral form some think

that the ordinary clinical signs may suffice, if not to recognise at the first onset phthisis in any subject whatever, at least to discover the cases of tuberculosis in a building where one knows that the disease has shown itself.

M. Grissonnanche thinks that, except contagious pleuropneumonia, the non-tubercular diseases of the lung and pleura are rare in the ox, so that when one observes in a bovine animal irregular respiratory movements, especially during inspiration, a harsh *bruit* due to pleural friction, a slight abortive cough, difficult to provoke by compression of the trachea, an exaggerated sensibility on percussion of the costal region, and tumefaction of the retro-pharyngeal glands, one may conclude that there is thoracic tuberculosis.

M. Cagny, starting from the fact, demonstrated by him, that the contagion of tuberculosis is an easy matter in a building that has contained an affected animal, views as suspected every animal that affects any sign of disturbed health whatever—every animal that does not profit by the nourishment that it receives. The veterinary surgeon ought then to examine with the greatest care the suspected subjects, he will endeavor to hear them cough, and then he will proceed to the examination of the chest. The emaciation that accompanies tuberculosis, according to M. Cagny, is not absolute; on the contrary it appears to him relative to the state of fatness (*embonpoint*) of the other animals in the same building; it will therefore be necessary to compare with one another the subjects submitted to the same hygienic conditions.

M. Cagny, again, recommends an examination of the degree of adhesion of the skin to the subjacent tissues, by the aid of a needle or the pointed canula of a hypodermic syringe; in a tuberculous ox the canula penetrates with difficulty across the skin and the subcutaneous tissue.

The pulmonary lesions almost always entail an enormous swelling of the bronchial lymphatic glands; hence, to the preceding symptoms there come to be added intermittent indigestions characterised by meteorism, a difficulty of respiration evidenced by a roaring sound, an obstacle to the venous circulation shown by repletion of the jugulars or by a venous pulse.

If one has to deal with an abdominal form, besides the probability derived from the emaciation, diarrhœa, state of the skin and hair, great importance must be attached, says M. Cagny, to a special intermittent indigestion, which disappears and then reappears after the next meal. This indigestion appears to be due to a swelling of the mesenteric glands. The diagnosis in this case being made rather with the eyes of the mind than with those of the body, the veterinarian will do well to fortify himself, if possible, with other indications.

He will carefully explore the udder and all the points where he has some chance of encountering tumefied lymphatic glands. A mammary nodosity or a hypertrophied lymphatic gland would give a very great assurance to the diagnosis.

M. Guittard, in a work in course of publication, also attaches to intermittent tympanitis a marked significance.

If the practitioner is sometimes puzzled despite the presence of the symptoms which we have mentioned, and of daily oscillation of the rectal temperature, etc., etc., he ought to be all the more perplexed when these symptoms exist singly, or when they are more or less marked by concomitant disturbance of doubtful value.

In these difficult cases recourse can be had to the search for the tubercle bacilli, or, better still, to test inoculations.

Koch's bacillus in pulmonary tuberculosis is frequently discharged along with the bronchial mucus. This mucus may be stained by the Koch-Ehrlich method, and one may see in the preparation the characteristic bacillus, or, better, the mucus can be inoculated by injection into the subcutaneous tissue of the guinea-pig—an animal eminently suited for revealing the presence of the virulent micro-organism by a rapid tuberculisation of the lymphatic glands.

We have demonstrated the great usefulness of the guinea-pig as a test subject, and M. Nocard has confirmed our assertions.

MM. Verneuil and Clado have advised inoculation into the peritoneum in order to hasten the formation of tubercles. Experiment has proved that the intra-peritoneal injection hardly gains a few days. It is not, then, indispensable to em-

ploy this method, which exposes the subjects to a premature death from a cause unconnected with phthisis. Moreover, it is not necessary to wait until the inoculation has produced tuberculosis of the lung before pronouncing affirmatively.

The tubercular lesions propagate themselves in the guinea-pig with an admirable regularity, which we have formerly pointed out. If the inoculation has been practiced under the skin of the thigh, the superficial and deep inguinal lymphatic glands, the sub-lumbar glands, the spleen, a retro-hepatic gland, and then finally the lung, are successively invaded by the tubercular process. It suffices that these lesions shall have reached the spleen to have all the value as a diagnostic test, and they are ordinarily advanced to that point twenty days after inoculation.

We advise, then, to practise subcutaneous inoculation at the inner face of the thigh on two or three guinea-pigs, and to proceed to the autopsy of these animals at the end of twenty days.

With the object of shortening the delay necessary for this proof, M. Nocard advises the extirpation of the tumefied lymphatic glands near the point of inoculation at the end of eight or ten days, and a search for the bacilli in their interior by means of scraping, staining, and microscopic examination. But all these proofs require one to be in possession of the virulent mucus. M. Nocard has remarked that it is rare that one can collect easily this mucus on the affected subject. After coughing the mucus is arrested in the pharynx, and the subject swallows it.

M. Poels has advised the making of a small tracheotomy wound at the root of the neck, in order to introduce as far as the origin of the bronchi a mop formed of a sponge fixed to the end of an iron wire. However slight this operation may be, it excites repugnance in the owners. M. Nocard has proposed to replace it by other methods less offensive. One can maintain the tongue of the animal out of the mouth by a vigorous traction, provoke a cough, and collect a mucus from the back of the tongue. One can also soak a sponge with mucus by rubbing it against the walls of the pharynx of the suspected animal by the aid of an appropriate instrument.

M. Cagny has further indicated the previous administration of a medicinal substance that exaggerates the secretion of the respiratory mucous membrane.

Should the animal present traces of mammary tuberculosis, one can examine microscopically and inoculate the milk taken from the lower strata of a conical glass in which one has placed a quantity twenty-four hours previously.

If the subject presents a suspected lymphatic gland, it must, without hesitation, be removed, and test inoculations must be made with the pulp of the diseased points.

Suppose that the disease is exclusively confined to the abdomen, or that it is impossible to obtain discharge, mucus, or non-caseous pulp of a superficial lymphatic gland, that is the occasion, if diagnosis is urgent, to have recourse to M. Peuch's method.

Several series of experiments have shown to M. Peuch that the pus from the seton of a cow attacked with tuberculosis contains Koch's bacillus from the eighth day. Out of ten guinea-pigs inoculated with  $\frac{1}{2}$  centimetre of pus, three have presented tubercular lesions. Consequently, in the case of suspicion, where all the other resources are absent, one could seton the suspected animal and inoculate a guinea-pig with the pus after the eighth day.

It is well to inoculate a considerable number of subjects, for one must expect to lose some of them by the action of septic microbes, which are almost infallably present, in the pus of the seton. These accidents, indeed, constitute a serious inconvenience.

We do not for a moment doubt that the transactions of the Congress will put on record some new elements of diagnosis, and that ultimately the task of the sanitary veterinary surgeon will become easier. But, admitting that this will not be the case, and that our profession will be still reduced to the means of diagnosis summarised by M. Lydtin and us, it will be none the less necessary, we believe, to extend to the other countries of Europe the measure taken by the French Government. Tuberculosis is not the only disease of which the diagnosis is surrounded with difficulties. Glanders is often as embarrass-

ing as tuberculosis ; for that also test inoculations have been proposed to remove the doubts of the practitioner. Does any one dream, actually, of striking out glanders from the list of diseases falling under the action of sanitary police ?

It is necessary, as M. Lydtin has said, to view the question of tuberculosis with as much *sang froid* as that of glanders, and in a few years the mind of everybody will be accustomed to measures which to day frighten some.

Moreover, it is not a case of pursuing tuberculosis with a fury that nothing can repel. The veterinary surgeon ought to act with prudence, with a wise discretion. When the case appears to him beyond the present resources of our art, he will abstain, and not lightly compromise his reputation and the authority of the law.

Consequently, we propose to the International Congress to emit the following views :—

(1) Bovine tuberculosis ought everywhere to be classed among the contagious maladies falling under the operation of sanitary police.

(2) Animals recognised tuberculous ought to be slaughtered, and their flesh ought to be excluded from consumption.

(3) A pecuniary indemnity ought to be accorded to owners, provided that the animals slaughtered have not been the object of commercial negotiations for one year previously.\*

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\*It was proposed alternatively, if the Congress should consider it impossible to grant an indemnity, to substitute for the second proposal the decree of the 28th July, 1888, by the Minister of Agriculture, regarding tuberculosis discovered in French territory, viz. :—

“ Every animal recognised tuberculous shall be isolated and sequestered. The animal must not be removed save to be slaughtered. The slaughter shall take place under the surveillance of a veterinary inspector, who shall make the autopsy of the animal, and send to the Prefect the minute of this operation within four days after the slaughter.”

(*To be continued.*)

## UNITED STATES VETERINARY MEDICAL ASSOCIATION.

### TWENTY-FIVE YEARS WORK REVIEWED.

An address delivered at the 26th Annual Meeting of the Association,  
by ex-President R. S. HUIDEKOPER, V.S.

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GENTLEMEN.—On reaching the end of another year of the life of this Association, during which I have had the honor to occupy your President's chair, I found so little accomplished by myself or the Association as a body, that I at first hesitated about referring to it at all, but upon looking back over the growth of the Association, I came to the conclusion that I could not be too meek, for perhaps I could find something that would justify me in having some pride and sharing it with my colleagues.

At least the Association was larger than it had ever been before; it has traveled more, its meetings had been held outside of New York and Boston. If as a body it had not advanced anything to startle the world, at least some of its members had brought themselves usefully and prominently before the public, and we could appropriate some of their reflected glory, and shine ourselves. By this time I was luminous with the achievements and dignity of the Society which I had the honor to represent. I was a Pharasee on a pinnacle, and, imbued with vain-glorious ardor, undertook to formulate our acts into words that would be grateful to you and satisfying to myself. I know what certain members of our body had been doing of credit to themselves and their communities, but where was the marked advance that would separate the last from all other years, the brilliant discovery that would mark one of the cycles of the history of veterinary medicine, the famous book that would adorn all medical libraries in the future and be a famous monument to the erudition of its writer?

My pride had a fall: but undaunted, and knowing, my colleagues, that you and I must certainly be scientific, and therefore reputable professional men deserving of public honor, for does not our Constitution say, after we have

signed it (as it also provides that we shall), that we are "stated and honorary members," whose "purposes and objects" are "to contribute to the diffusion of true science and particularly the knowledge of veterinary medicine and surgery." Do I not find upon our printed list of honorary members seven names? True, five are dead. Do I not find upon the Secretary's roll two hundred and seven names? It is again true that only about forty ever come to our meetings, and a vast number are so occupied with the diffusion of scientific knowledge and other duties that they have not time to obtain their certificates of membership and pay their dues. But, such a number of the most distinguished doctors of the land, bound by such a code of ethics as we also find in the constitution, must surely be "weights of high renown," and I again fell to day-dreaming of our celebrity, of our usefulness, not only as practitioners to the individual, but as health officers for the common weal, as economists for the great agricultural community in their dealings in motors and food animals, as experimental pathologists, who verify the work of and offer medical hypotheses for our sister profession, human medicine.

I searched the lexicons for terms which would give us sufficient praise. The story of Solomon and the lily brought in an allusion to botany, to be sure, but was scarcely strictly veterinary. The one about the lion's skin as another's robe, certainly was a veterinary simile, and reminded me somewhat of certain discussions at medical society meetings, but still was not quite appropriate. At last I thought of the tale of the turtle and the hare, and was so *well* satisfied that I put down my pen, folded up my tents, and stole away to other occupations for a week, during which time this eventful meeting in Brooklyn did not enter my head. To my surprise, when I took up the subject again, I found that other people's hares were arriving everywhere and my turtle had not finished an address to you for me, nor indeed had he accomplished anything. I studied over the matter, convinced still that my turtle was a good simile, and I became more convinced of it the farther I went. Veterinary medicine, like

the turtle, must drag itself from a lowly origin. Its advance must be slow, through the mire of public prejudice, entangled by the reeds of quackery on all sides; when in clear water it must not resent attacks, but draw in for the moment, safe in its own solid usefulness, to come to the surface again and climb to the shore at the proper time. But, as I said, my turtle had done nothing, and I was in despair. Then I took to studying turtles. Terrapin looked the most attractive to begin with, but it has only one use. The great, green turtle does not live in my neighborhood, and I could not investigate its qualities. However, the mud turtle abounds, and the more I become acquainted with this noble animal, the closer I find the relationship between it and our Association to be. Gentlemen, the mud turtle has good qualities, and when induced to move is capable of going long distances, but it has one sad trait—it is *lazy*.

I then wondered if only I and the committees I had appointed for the last year were also lazy, or if it was an Association characteristic. I went back to the records and with your permission will replace an account of what we have *not* done during the last year by a summary of what has been done before us for a quarter century, and an outline of what we may do in the next.

#### FORMATION UNITED STATES VETERINARY MEDICAL ASSOCIATION.

*First Meeting, 1863.*—On the ninth of June, 1863, according to a previous arrangement, a large number of veterinary surgeons and practitioners met at the Astor House, New York. Wm. A. Wisdom, of Delaware, stated the object of the meeting and read the minutes of two meetings which had been held in Philadelphia the previous year. Dr. John Busteed, of New York, was appointed Chairman to organize the meeting, and R. Jennings, of Bordentown, was appointed Secretary.

The following States were represented at this first meeting: New York by John Busteed, A. S. Copeman, R. H. Curtis, A. Liautard, A. Large, Louis Brandt, C. C. Price, W.

Bannister, Wm. J. M. Cown, John Budd, R. Nostrand, C. Burden and James Milligan. Massachusetts by Chas. M. Wood, E. F. Thayer, Wm. Saunders, R. Farley, J. H. Stickney, James Penniman, O. H. Flagg and R. Wood. Maine by E. F. Ripley. Pennsylvania by R. McClure, G. Mellor, J. C. Essenwein, E. H. Palmer and Isaiah Michener. Delaware by Wm. A. Wisdom. Ohio by G. W. Bowler. New Jersey by Jacob Dilts, J. C. Higgins, W. R. Mankin, R. Jennings, A. Philips, Jacob Philips, J. C. Walton, A. C. Budd and S. Humphrey. From London were J. K. Quickfall and John Arnold.

They appointed the following committee to draft a Constitution and By-laws, and the meeting adjourned until 9 o'clock the following morning: Committee of Organization—J. H. Stickney, Boston, Chairman; S. W. Bowler, Cincinnati; A. S. Copeman, Utica, N. Y.; Isaiah Michener, Pennsylvania; Jacob Dilts, New Jersey; E. F. Ripley, Maine; Wm. A. Wisdom, Delaware; Dr. Jno. Busteed, ex-officio.

On June 10th, 1863, at 9 A. M. Dr. Busteed called the meeting to order and Dr. J. H. Stickney, Chairman of the committee, read a draft of a Constitution and By-laws, which were adopted.

An election for officers resulted in the choice of President—Dr. J. H. Stickney; Vice-Presidents—R. H. Curtis, New York; Wm. Saunders, Mass.; E. F. Ripley, Maine; R. M. McClure, Penn.; Wm. A. Wisdom, Delaware; G. W. Bowler, Ohio; R. Jennings, New Jersey. Recording Secretary—Dr. A. Liautard, New York. Corresponding Secretaries—Wm. J. McCoun, New York; R. Wood, Massachusetts; Isaiah Michener, Pennsylvania; J. C. Walters, New Jersey. Treasurer—A. S. Copeman. Censors—A. Large, New York; C. M. Wood, Boston; E. H. Palmer, Pennsylvania; E. F. Thayer, Mass.; Jacob Dilts, New Jersey; J. C. Essenwein, Philadelphia.

A resolution was adopted of thanks of the Association to Dr. J. Busteed, for his efforts and impartiality in organising the meeting, and to R. Jennings and R. McClure for their zeal and perseverance in forming the previous meeting in Philadelphia.

Dr. J. Busteed moved that the Association appoint an orator for the ensuing anniversary meeting, but declined acting as such himself.

R. McClure gave an address on "The Origin and Importance of Veterinary Education and Science."

R. Jennings presented some pathological specimens, with an address which was ordered to be placed on record, and Chas. M. Wood read an article on "Veterinary Education," after which the meeting was adjourned until the first Monday of September, 1864.

*First semi-Annual, 1864.*—On January 19th, 1864, there was a meeting of the Comitia Minora held in New York. It was called to order by the President. Some difficulty seems to have existed over the status of some gentlemen as original members, they having been present at the Philadelphia meetings, but not at the time of organization in New York. R. Jennings presented a paper (title not given) and read one from G. W. Bowler on "Rabies."

*First Annual, 1864.*—On September 6th, 1864, the annual meeting was called to order, at the Astor House, New York, by the President, J. H. Stickney.

Dr. Busteed, Library Committee, reported that he had not received any contributions for the library.

R. Jennings presented the Association with one copy of "The Horse and his Diseases," one copy "Cattle and their Diseases," and one "Sheep, Swine and Poultry" for the Library, which seems to have been the only active measure ever taken in that direction.

The Corresponding Secretaries were reduced to one and the Board of Censors increased from six to nine, which, however, appears never to have been fulfilled.

The following papers were presented: A. S. Copeman, "Composition and Fundamental Properties of the various Tissues of Animals;" G. W. Bowler, "Atrophy of Kidneys in two Calves;" R. Jennings, "Suppression of Urine in a Horse;" C. M. Wood, "Status of Veterinary Science in the United States;" A. S. Copeman, "Physical and Vital Forces."

An election of officers resulted in choice of: President—A. S. Copeman; Vice-Presidents—R. H. Curtis, Wm. Saunders, C. F. Ripley, G. Mellor, W. A. Wisdom, G. W. Bowler and J. G. Walton. Corresponding Secretaries—W. J. M. Coun, O. H. Flagg, E. Nostrand, Sil. Humphrey. Treasurer—C. M. Wood. Censors—C. C. Grice, New York, E. F. Thayer and J. H. Stickney, Mass., A. Philips, New Jersey; Isaiah Michener, Pennsylvania; A. Liautard, New York..

The death of Edwin H. Palmer, of Pennsylvania, was announced.

Committees—Education—Liautard, Wood and Bowler; Finance—Saunders, E. H. Birney and Ripley; Library—J. Busteed, Jennings and Grice; Diseases—Stickney, Thayer and Michener.

*Second Semi-Annual*, 1865.—On March 7th, 1865, the Comitia Minora held a meeting at the office of Dr. Liautard, in New York, at which there was no action of note.

*Second Annual*—The second annual meeting was held at Young's Hotel, Boston, on September 5th, 1865. A. S. Copeman, President, in the chair. The Censors were empowered to fill vacancies in their board in order to obtain a quorum.

Henry Lawrence was admitted to membership. An election of officers resulted: President—C. M. Wood; Vice-Presidents—W. S. M. Cown, W. Saunders, W. A. Wisdom, Isaiah Michener, C. Higgins and E. F. Ripley; Recording Secretary—C. Burden; Censors—Messrs. Bowler, Stickney, Large, Liautard, Wood and Copeman.

A. S. Copeman, the retiring President, read an article on "Philosophy of the Sciences." A. M. McClure was expelled for ungentlemanly conduct at the last meeting.

*Third Semi-Annual*.—March 5th, 1866, a special meeting of Comitia Minora was held at the New York College of Veterinary Surgeons, President C. M. Wood in the chair, at which a motion made at the annual meeting to hold the semi-annual meeting at Philadelphia was rescinded.

March 6th, 1866, the semi-annual meeting was called to order in the New York College of Veterinary Surgeons, at which action was taken as to the duties of Secretary, the

employment of secret medicines and the qualifications of membership.

*Third Annual, 1866.*—The third annual meeting was held in New York College of Veterinary Surgeons, on September 4th, 1866. A committee was appointed to investigate charges brought against R. Jennings, while acting as Secretary, of tampering with the records, also of withholding certain papers belonging to the Association.

Upon their report Mr. Jennings was expelled from the Association. A committee was appointed to prepare a code of ethics, which they presented later in the day and which were adopted. Dr. J. Busteed was then elected an honorary member. Papers were read by H. Lawrence and one by A. S. Copeman on "Diseases of the Chest," followed by a discussion on navicular disease.

The following officers were elected: President—R. H. Curtis; Vice-Presidents—E. F. Ripley, W. A. Wisdom, A. Philips, G. W. Bowler, J. F. Budd and O. H. Flagg. Recording Secretary—C. Burden. Treasurer—E. F. Thayer. Corresponding Secretaries—M. Coun, Michener, Walton and Stickney. Censors—C. M. Wood, Stickney, Large, R. Wood, Saunders and Liautard.

*Fourth Semi-Annual.*—The fourth semi-annual meeting of the Comitia Minora was held at Young's Hotel, in Boston, March 5th, 1867, R. A. Curtis, President, in the chair. The Comitia Minora reported the Constitution and By-laws revised and with amendments and the Secretary was ordered to have printed one hundred copies.

*Fourth Annual Meeting.*—The fourth annual meeting was called to order in the New York College of Veterinary Surgeons on September 3d, 1867.

The minutes of the semi-annual meeting, with the revised Constitution, were read and the latter adopted with one alteration, viz: that the time of holding the annual meeting be the third Tuesday in September.

An election for officers resulted in choice for President—Robert Wood; Vice-President—W. H. Wisdom; Treasurer—E. F. Thayer; Recording Secretary—J. F. Budd; Corres-

ponding Secretary—F. C. Walton; Censors—C. M. Wood, J. H. Stickney, A. Large, A. Liautard, W. Saunders, O. H. Flagg.

A. Large and A. Liautard reported diseases existing on Long Island, which they named "Cerebro Spinal Meningitis," and C. M. Wood one on scrotal hernia.

The Comitia Minora was ordered to prepare a new Diploma.

Drs. C. M. Wood, Stickney, Thayer and Large were appointed a committee "to review and revise the transactions of the past and future," and it was resolved that all the transactions of the Association up to the present time be published in one volume.

*Fifth Semi-Annual.*—The fifth semi-annual meeting was again held in New York at the same place, on March 5, 1868. An addition to Article VIII. of the constitution was offered, providing that all members two years in arrears of their dues should have their names dropped from the rolls. A committee consisting of Messrs. Large, Liautard, Stickney, C. M. Wood, and Thayer were appointed to "investigate the subject of printing a veterinary journal." This meeting was honored by the presence of Prof. Gamgee, of London.

*Fifth Annual Meeting.*—The fifth annual meeting was held at Young's Hotel, Boston, September 1, 1868.

The action in regard to a special committee revising and publishing the transactions of the Association were reconsidered, and this duty was given to the Committee on Intelligence and Education. James L. Robertson, of New York, and I. S. Lombard, of Boston, were admitted as members. The resignation of R. H. Curtis was accepted, and he was elected as honorary member. The officers of the last year were re-elected: President, R. Wood; Vice-President, W. A. Wisdom; Secretary, J. F. Budd; Treasurer, E. F. Thayer; Censors, C. M. Wood, A. Liautard, J. H. Stickney, A. Large, W. Saunders, and O. H. Flagg.

A motion was carried "That the United States Veterinary Medical Association as a body protest against the appointment by the general government, through the recommenda-

tion of General Grant, of Mr. Alexander Dunbar as a clinical lecturer to the army veterinary surgeons and farriers, for an alleged discovery of a mode of treatment of the diseases of horses' feet, the operation being no discovery, but a regeneration of an obsolete idea, and worthy of the attention and patronage of the Society for the Prevention of Cruelty to Animals, it being both an evidence of ignorance and barbarity. Furthermore, Mr. Dunbar has no claim whatever to the title of Veterinary Surgeon, either by education or professional association."

*Sixth Semi-Annual Meeting.*—The sixth semi-annual meeting was again held at Young's Hotel, Boston, on March 16th, 1869. The following important resolution was adopted, "Whereas, the United States Veterinary Medical Association, founded in June, 1863, has issued diplomas of membership to members of said Association, and whereas the issue is illegal, the Association not being incorporated or chartered, it is recommended by the Comita Minora to the Association that the issue of diplomas to new members be stopped, that all the old diplomas be recalled by the Secretary, and that sixty days after said record the Secretary be ordered to publish a notice in the newspapers, notifying the public that all diplomas claimed or exhibited as coming from said Association are illegal, consequently of no professional value, and that instead of said diploma the Association only issues a private receipt of the initiatory fee." The death of the former President, R. H. Curtis, was announced.

*(To be continued).*

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## REVIEW AND CRITICISM

### OF THE MEETING OF THE UNITED STATES VETERINARY MEDICAL ASSOCIATION.

BY N. N. S.

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The 26th Annual Meeting of the United States Veterinary Medical Association has taken place, and while it may not have accomplished as much as we could have wished, still it has taken up a new course, that promises for it a wider sphere

of usefulness than it has attempted before. This meeting will be better valued in the future years than we can estimate at present. It presented and adopted a revised constitution and by-laws, in which are more carefully defined its aim and plan of working than ever before. It has placed stronger safeguards around its future list of members, and laid a just responsibility on each of its members' introducing for consideration candidates for membership. It has changed its meetings from two to one, this to take place in September of every year, and to last two or more days, and no one step in its history ever promised greater benefit and usefulness than this. It means more thoughtful, more considerate work, more united and fruitful labors in discharging the grave responsibilities it upholds for our country. It means better papers, better reports; for the members will be guaranteed a fuller hearing and more deliberate enforcement of plans suggested for the general good of the profession. It promises a wise stimulus for different sections of the United States to compete for its meetings, and this means a greater membership and a more diffuse interest in its work throughout our whole country.

The removal of the Board of Censors from elective to appointive offices by the President is a wise step. A President should always have his cabinet in sympathy with him. Those of his own appointment must be such as will sustain, uphold and work for the completion of his general plans, and it affords for the welfare of all the component parts of the Association. It can be so appointed by the presiding officer as to provide justly and equitably for all the interests of the Association involved, both in the sense of locality and of the various schools represented or seeking recognition within our body. Another point it brings out, and that is the greater necessity for real work by the President; for the responsibility for the faithful execution of the yearly work will no longer be divided and scattered, but the Association will place at the proper door the responsibility, and by a defeat or re-election ever have a strong weapon of decision as to the proper progress of our work. Many other minor changes were

made, and among them the future plan, now explicit and concise, of collecting the initiation fees and dues, and one year's enforcement of the new rules will rid the Association of all dead wood and leave only an interested and working body of members, the only ones it has room for.

President Huidekoper's review of twenty-five years' work of our Association was a valuable and suggestive contribution, and should be printed and placed before every member of the Association. It should be studied and reread, so that where our Association has lacked in duty and proper work, each member may find therein where he individually has failed to do his duty. I would commend it to each member, and trust that they will critically examine it and sum up how much he has done as a member for the general welfare of the calling he represents through the United States Veterinary Medical Association. And I would say one word for the ex-President: Had he done nothing else than the compilation of this review, he deserves our generous compliments for this; but during his membership and during his official period he has well and truly considered the welfare of the Association he presided over, and there were no hours or time that its needs could not command a hearing or aid in the completion of its work. He surely retires from the office worthy of our sincere thanks, and leaves its affairs better than he found them.

The report of Chairman Coates of the Committee on Intelligence and Education is well worthy of a wider circulation, and I hope to hear of its publication before many months. It has rich food for the winter evenings' consideration, and no minds are so dwarfed to the narrow or sordid aims of his profession but what will be pierced with a broader light after a perusal of his well considered and timely measured words. Let the Association direct its issue for circulation among its members.

From Chairman Clements, of the Committee on Contagious and Infectious Diseases, was a more or less complete report on our whole country, as to the prevalence and extent of this whole line of diseases, and what it lacks in complete-

ness rests entirely upon the dilatory and indifferent members of the Association. Perhaps its embodiment in pamphlet form might enable future Chairmen in this work the opportunity of making a complete annual epitome of the contagious and infectious diseases. At a future meeting I hope to hear a more extended argument of his suggestion to drop the word infectious and substitute miasmatic.

The resolution of Dr. C. P. Lyman for the organization of a central legalized body, may prove one of the means of making future meetings of our Association the source of all national movements and work of the profession, to find its avenues and streams of completion in the delegates from local and state organizations of veterinarians and sanitarians, stock raisers, growers and owners. In the hands of such an able committee, consisting of Drs. Lyman, Huidekoper and Joseph L. Robertson, the profession will eagerly wait for the maturity of their plans and suggestions.

From the pen of the veteran L. McLean, of Brooklyn, was received and approved terse resolutions relative to tuberculosis. Its approval should be completed by its broadcast distribution, that the future may well point to our Association as the early agitator and detector of its importance and danger to the whole world of warm-blooded animals. Let it not be placed under a bushel.

The work of research from the pen of Dr. Faust was only partially heard, owing to the working day, commencing as it was at 8:15 A.M. and ending at 7 P.M.—a half hour later than the hour fixed for the banquet, but such of it as was listened to gave sufficient promise of its great value that simple justice to the labor that produced it should direct its production in print at once, as a part of the transactions of the 26th annual meeting of the Association.

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ALL THE DIFFERENCE IN THE WORLD.—“And you will not be mine?” he asked tenderly as he took her hand. “No, Percy,” she replied, “I can never marry a horse doctor, but the moment you become a veterinary surgeon I am yours.”—*Fudge.*

## THE DIARRHŒAS OR "SCOURS" OF NURSLINGS: COLTS, CALVES AND LAMBS.

BY G. ARCHIE STOCKWELL, M.D., F.Z.S., Member of New Sydenham Society (London).

(Continued from page 325).

To recapitulate:—Diarrhœa may be a salutary process primarily, and secondarily an ailment sufficiently serious to endanger life. The bowel, it must be remembered, is not only the medium of absorption of chyle and nourishment, but as well the means of ridding the economy of poisonous, effete and excrementitious matters that, retained, prove detrimental and dangerous. Further, we must accept the doctrine that we are concerned most of all in the gastro-intestinal diseases of nurslings, with the development of bacteria, primarily dependent upon failure of complete digestion, and consequently imperfect absorption.

When a mass of objectionable and indigestible food is consumed, diarrhœa is evidence of Nature's attempt to repair the error. This, too, is the common origin of scouring among young animals of all classes and grades, and is due chiefly to the curding of milk and lack of power of the digestive juices to act thereon; a hard, firm, indigestible mass is formed which no stomach, unaided, can break down, and which, passing through the intestine, irritates and tempts inflammatory action. Morbid curding too often is the effect of bolting, or hasty consumption of milk; and one of the provoking causes in calves is, their being allowed to suckle at the same moment milking is carried on. In such cases the milk is not sufficiently mixed with the secretions of the mouth; bolting incites the rumen to too quick action; the food is hurried to the abomasum; and the druling secretion which might meet the food in the rumen is obtained too late. Again, curding may be due solely to preternatural acidity of the *primæ viæ*.

Scours in colts, not due to *entozooæ* or constitutional tendencies, are almost invariably derived from suppressed digestive activity, irritating food, or disordered biliary secretion.

In calves, aside from causes just noted, may be considered the driving and worrying of the parent, an act that especially favors the production of tyrotoxicon in the milk. This and other forms of over-heating affecting the lactal supply, are the causes of heavy mortality among infantile bovines. In nursing lambs, since ovines are possessed of most impressionable nervous systems, and consequently of little economic tonicity (general or nervous), diarrhœa is a most fatal disease, even when originating from causes that would be deemed practically harmless in other creatures; it demands prompt attention and the closest care. The chief causes as before mentioned are, sudden changes of temperature, exposure, impure air dependent upon miasm and crowding, and overheated sheds, cold drinks administered to the ewe, and, above all, the whole range of imperfect diet.

#### TREATMENT.

The indications are: *First*, to remove the poison and source of irritation; *Second*, to restore to the secretions their normal constituents, thereby ensuring proper digestion; *Third*, to combat such inflammation as may have arisen from poisoning and non-assimilation; *Fourth*, to restore to the economy at large, and as speedily as possible, that of which it has been deprived; *Fifth*, when the discharges are so profuse as to threaten collapse, or otherwise endanger the life of the creature, to check the same by the method that will most surely suppress the waste of serum, and least tend to absorption of toxics—ptomaines. These last two propositions are in a great measure dependent upon the second, and indirectly, also, the third.

To attempt to arrest the flux by means of astringents, singly or combined with opiates and antacids, is, as a rule, pernicious, since it tends to aid the very processes that it is desirable to suppress, viz., the absorption of ptomaines. There are cases, however, of extreme emergency, when suppression of the diarrhœa is imperative, but even these are not benefited by astringents purely. Opiates relieve suffering, but also, when administered empirically and without due consid-

ation of physiological action, lock up the secretions, normal and abnormal alike. The ill effects of such therapeutics may be seen in calves, when the farmer's wife essays to check the scouring, and, if successful, locks up an indigestible mass in the intestines to the induction of an enteritis, or provokes a gastric catarrh that later proves fatal; fatality is of course laid to the exhaustion produced by the diarrhœa, instead, as should be, at the door of the astringent. Nevertheless, when the diarrhœa is of the nature of a gastric catarrh, mild astringents combined with opiates and antacids are often of value, along with lactic acid or other antiseptic; also, in diarrhœas that are reflex products. In such cases it is the *tonic* astringents that are indicated.

What then are the therapeutic measures most available?

*First*, mercurial or other alteratives of like action. *Second*, pepsin, pancreatin, bismuth, cerium, analgesin, chloral, wild yam, leptandrin and drugs of its class, hydrastin, salicylic acid, lactic acid, carbolic acid, mineral acids. *Third*, tonics. *Fourth*, strict attention to diet.

A full dose of mercurial or other cathartic (not less than eight to sixteen grains of calomel for a suckling colt or calf, or four to eight grains for a lamb under four weeks of age, with ext. colocynth. comp., and camphor mono-bromide to prevent griping) clears the intestines of irritating matters, changes the character of the secretions toward normal, and by stimulation of mucous follicles clears their orifices and substitutes mucous for serous exudation. This alone, after the cathartic effect has passed off, will show great diminution in the diarrhœa, and less serosity. Next it should be followed by remedies to re-establish normal secretion and digestion; to relieve inflammation and excessive peristalsis, and to further the expulsion or neutralization of any remaining poison. First, now, pepsin and pancreatin come in play; next the antacids, of which the best are cerium oxalate and bismuth sub-carbonate. After calomel, for a few hours, mineral acids are best avoided, and the lactic acid substituted, though salivation is all but impossible in any nursing animal, even the human infant; but leptandrin, ipecac in minute doses

with sugar of milk, euonymin, baptistin, and especially hydrastin, continue the good action of the mercurial and tend to check the flux, especially if combined with cerium and camphor bromide. In the meantime, pepsin and pancreatin are advantageously prescribed in connection with feeding as hereinafter mentioned, though the former may be added to the alteratives by omitting the cerium or bismuth. For reasons obvious also, these are best administered in suspension (in some mucilaginous vehicle prepared from tragacanth or acacia) for calves and lambs, whereas with colts the mode of exhibition is immaterial except in so far as convenience is concerned.

When the diarrhœa is exhaustively depleting and of serous character, so much as to admit of no delay, fluid ext. of coto bark, (three to ten drops—half doses for lambs) with or without an equal quantity of fluid ext. of wild yam, accordingly as there is, or is not, evidence of severe griping, will answer every purpose of an astringent without the pernicious action of the latter; it appears to be a stimulant, alterative, and stomachic, of specific action upon intestinal mucous membranes. When pain is manifestly severe and colicky, the wild yam (a few drops at a time, of the fluid extract), is especially indicated, or if it seems desirable to anæsthetize the intestine and suspend peristaltic action, chloral or analgesin is indicated, the rest thus given the bowels being often of incalculable value.

After the administration of chloral or analgesin, or after the inflammation is calmed by coto and yam, pepsin and pancreatin come in play, and also the alteratives and antacids. In lenteric diarrhœas, trypsin or pancreatin is imperatively demanded, and, as Professor LeSage truly remarks, "is the only remedy that does any good except a purgative, which may be given for the purpose of clearing out the fermented and undigested milk." When pepsin is employed, however, the antacids must be given separately, and with considerable interval between the two, for as pepsin acts only in an acid medium, the addition of bismuth, cerium or other antacids, is alike unchemical and unphysiological, the action of the for-

mer being prevented or neutralized. The good effects so often claimed of this combination, are due solely to the mechanical action of the antacid in spreading itself over inflamed surfaces and thus temporarily relieving irritation.

When the diarrrhœal disturbance can be traced to some fault in the economy of the parent, this should be looked after and remedied. A saline aperient administered to the dam at occasional intervals, is especially valuable when there is a tendency to scours of epizootic nature among the flocks and herds, or that are due to indigestible curded milk. Indeed, when scours appear, it is usually best to remove the suckling from the dam, and hand-feed, in order to insure proper food, or to remove the mother from the herd or flock into a paddock to the same end.

When the dejections of the suckling are freely acid, fatty, and manifestly accompanied by tenesmus, it is more than probable the primary fault is imperfect or improper pancreatic digestion, when pancreatin is demanded (perhaps in connection with an antacid and alterative) to aid in restoring the function. *Per contra* if the fæces are abundant in curd, pepsin is required to be exhibited. Both conditions may, and do, obtain together. Again, light colored dejections denote deficiency in biliary products, but if dark and green the reverse; but it must be remembered, as before noted, that lack of biliary secretion is too often a concomitant of defective pancreatic secretion in nurslings, also that biliary excesses are likewise accompanied by pancreatic excesses, when the stomach is almost certain to be deficient in the material by which its contents are transformed into peptones.

#### DIGESTIVE FERMENTS.

In most forms of diarrrhœa the sheet-anchors of treatment so to speak, *i. e.* after the irritating ingesta is gotten rid of or immediate inflammation allayed, are the digestive ferments, pepsin and pancreatin. These are the only strictly physiological remedies of which we are possessed, and, most unfortunately, are generally overlooked, and as generally, perhaps, misunderstood as to their therapeutical application and value.

Further, a fact not generally known is, that both these ferments are much more definite and certain in their effects in the *primæ viæ* of nurslings of all forms and classes, than in corresponding adults, and for the reason that greater demands are made upon both, and the natural supply of ferments depend upon the exact character and quality of the food supplied.

Pepsin, as a therapeutic agent, has never been obtained as a distinct principle in a complete state of purity, but is contaminated in greater or less degree with substances which are themselves inert, but present insurmountable difficulties in separation. Acting in an acid medium, it exercises its digestive function upon albuminoids solely; for this reason its popular administration in connection with an alkali, such as soda bicarbonate, is a source of grievous error. Its employment must be decided upon from a strictly chemico-physiological standpoint, and the above facts borne in mind, for it is very far from being, as is generally and popularly assumed, an universal digestant.

The action of pepsin, too, is in a sense catalytic; and, theoretically, a small quantity should digest an unlimited quantity of albumen. The conditions for such action, however, do not exist within the animal economy, especially in the class of diseases to which the remedy is applicable. We cannot rationally expect a minute quantity of the remedy to digest food unreasonable both as to quantity and quality. The general failure of pepsin in theoretical and therapeutical applications, aside from the causes already noted, are from the exhibition of small and inefficient doses, or from employing an inferior and perhaps insoluble article. A large proportion of the pepsins in the market are known to be insoluble and inert. All vary in quality, and may, moreover, contain elements that are themselves pernicious, and of the very class and character it is desired to get rid of that are concomitants of ptomaines. Prof. Victor C. Vaughn asserts this as a fact of most, if not all, low grade pepsins, and when we consider the mode of manufacture and production, we can readily understand why this is so. For these reasons I deem it fit to present the

results of the analyses of the best known products, as made by John R. Winslow (Professor Chemistry Woman's Medical College, Baltimore), and Dr. P. H. Crittenden (of the Chemico-Physiological Laboratory of Yale University), of pepsins purchased in the open market, as a guide to intelligent administration and employment. These analyses together are as follows:

1.	Parke, Davis & Co's., of Albumen.....	1 grain dissolves 2,000 grains.
2.	Fairchild's, of Albumen.....	1 " " 1,200 "
3.	Scheffer's, of Albumen.....	1 " " 960 "
4.	Jensen's, of Albumen.....	1 " " 700 "
5.	Ford's, of Albumen.....	1 " " 640 "
6.	Merck's, of Albumen.....	1 " " 320 "
7.	Boudault's, of Albumen.....	1 " " 280 "
8.	Royal Chemical Co., of Albumen.....	1 " " 180 "

These experiments, being purely chemical, represent possibilities obtainable in the laboratory, but not of course uniform in the stomach; digestive power, within the economy as before noted, is considerably less (for reasons which cannot be entered upon in this connection), and further modified by circumstances—disease, character of the food, amount of fluids taken, etc.

*(To be continued.)*

## RESOLUTIONS ON TUBERCULOSIS.

Presented at the Twenty-sixth Meeting of the United States Veterinary Medical Association, by L. MCLEAN, V.S., Brooklyn, N. Y.

*Whereas,* We, the members of the United States Veterinary Medical Association, being sensible of the prevalence of bovine tuberculosis in the United States, particularly in the dairy stock of the eastern States, it being computed that at least from 10 to 15 per cent. are so affected in one form or another, and being satisfied of its infectious and contagious character and of its identity with tuberculosis, or consumption, in the human family, and that it can be conveyed to others both by inoculation and ingestion, believing that a large percentage of this disease in mankind can be traced to this source;

*Resolved*, That we strongly condemn the use of the milk or flesh of animals so affected in any form, as an article of diet.

2. *Resolved*, That this Association urgently protests against the employment of empirics as meat or dairy inspectors; that such duties should be confined to duly qualified veterinarians having a comprehensive knowledge of comparative pathology.

3. *Resolved*, That the inspection of meat can only be properly conducted at the abattoirs.

4. *Resolved*, That all dairies should be periodically visited, the cows carefully examined and their condition reported upon to the local authorities.

5. *Resolved*, That a committee of three be appointed by the Chair to place these resolutions before the Secretary of Agriculture, so that national measures may be adopted by which this disease can be placed under the same category as contagious pleuro pneumonia, and to be similarly dealt with.

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## REPORTS OF CASES.

*"Careful observation makes a skillful practitioner, but his skill dies with him. By recording his observations he adds to the knowledge of his profession, and assists by his facts in building up the solid edifice of pathological science."*—VETERINARY RECORD.

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### A MISTAKE.

By S. R. HOWARD, V.S., Hillsboro, Ohio.

Enclosed find two communications that afforded me considerable interest. I am only a poor country practitioner, and perhaps not as "well up" as many. We all make mistakes, I am well aware. By others' mistakes we often profit. One should never be ashamed of an honest mistake, especially to his brethren.

Although young in the profession I have examined a great number of ruptures, and have never failed as to diagnosing their nature until this case, which quite staggered me.

Called eighteen miles. Patient, a 7-year old Clyde mare with 4-weeks colt, both with drove.

Tumor two hands' breadth in circumference low in left flank. Examined *very, very* carefully externally and three times per rectum. With examinations I felt perfectly satisfied.

Diagnosed abscess from injury. She was rather poor, so was colt. She was suffering from strangles. Have seen a number of abscesses corresponding exactly to this.

I still felt suspicious. Warned the owner I might be mistaken. Examined again carefully per rectum. Introduced small trocar at least half a dozen times. Found serum every time. Would not flow freely.

Found not the least trace of a lesion of abdominal wall by rectal examination. Owners said "Go ahead!"

With considerable foreboding and reluctance I prepared needles, etc., for worst.

Secured her—twich and foot strap. With guarded abscess knife made incision about two inches in length and one-half in depth. She struggled violently. A gush of serum streamed out, and about six inches, more or less, of small intestine protruded uninjured.

Immediately pushed bowel back and held it in place with one hand. Picked up needle and after a fight managed to get about seven very irregular stitches. Tumor somewhat subsided. Serum continued to discharge slightly.

Advised quietude, injection, soft feed, etc. Too far to visit the case.

Every few days was informed that discharge was growing profuse and pus-like. This continued for two weeks when opening healed. Tumor regained former size.

Discharge amounted to many gallons.

Found dead two weeks after closure of wound. At my own expense I went to examine her.

*Post mortem*.—Citatrice perfect. Laid back skin and panniculus. Abdominal tunic greatly thickened. Could insert fist in lesion of abdominal wall. Peritoneum intact. Intestine adhering all around and in sac.

A closed abscess containing very little pus, large enough to admit hand, ran completely around sac, extremities of ab-

scuss almost continuous. Intestines healthy. Ruptured stomach. Rest of cadaver seemed healthy.

Two young M. D-s were present and loudly proclaimed her death was caused by ruptured stomach. So it stands. How I missed the correct diagnosis I cannot understand.

So I say, be careful.

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#### PUNCTURE OF ABDOMINAL WALL.

BY THE SAME.

Aug. 10. Mare frightened and jumped on picket fence. Remained there until fence was razed. One pale entered abdomen about three inches. I was called three hours after. Local talent had been at work.

Pulse rapid, weak and about 70; head pendulous; surface of body and extremities cold; bowels out a foot and a half at least, black and cold; had laid down on gut several times. Told them "It's a *very, very* doubtful case indeed. Do what you can." Ordered water heated, and started a man for tracheotomy tube. Gave stimulant, and prepared solution bichloride mercury, needles, etc. Laid her carefully on her back and secured her.

Protrusion proved to be cœcum with some gastro-colic omentum. Puncture about three inches in extent and situated half-way between umbilicus and xyphoid cartilage and almost in mesian line. Bathed bowel with warm, weak antiseptic until it was warm.

I endeavored for at least half an hour to return it; could not; too much straining; could not wait for tube. I enlarged opening an inch or two; no hemorrhage externally from cut. I now returned bowel easily; opening now about five inches in length. Took six stitches, four strands each, needle in handle. Started them at least an inch back, and carried them entirely through abdominal wall. Think I drew them too tight.

Released her; remained down an hour; gave stimulant, dried and blanketed her; very much distressed and weak; got up and walked to cowshed; crowd soon dispersed; remained alone with her all night; towards morning ate and

drank considerable ; by daylight appeared very bright and active, neighing for colt, pulse almost normal and temperature a little elevated.

Owners came six miles; prepared to bury her. Going home they could not keep her from trotting. For wound antiseptic dressing; soft feed, quietude, injections per rectum, etc.

Aug. 12. Pulse 50 and strong; temperature  $100\frac{3}{4}^{\circ}$  F.; appetite good; slight swelling along abdomen; bloody serum dropping from wound; not a bit stiff; milk failing.

Aug. 15. Condition about same; great appetite; has not laid down yet.

Aug. 17. Condition suddenly changed; laid down several times, and remained down for half an hour at a time. Pulse 70; indistinct at jaw; temperature normal; greatly tucked up; respiration about 25; surface very cold; small stream of bloody serum almost constantly flowing. Stitches very loose; extensive swelling along abdomen and sheath; dilated pupils; very stupid and stiff.

Pressure on abdomen elicited no response; gave stimulant and passed small canula between lips of wound; no flow; waited an hour.

Diagnosis; dying slowly; led her out to die; waited two hours; condition growing rapidly worse; very weak and trembling; remained standing.

Exposed jugular and injected into it six or seven hypodermics of air, producing no effect; waited half an hour; dispatched her.

*Post mortem.*—Stitches loose; wound almost entirely healed; sub-peritoneal tissue greatly thickened, an inch at least at wound; peritoneum inflamed; no effusion in cavity; great patches of inflammation upon all the intestines. Cæcum thickened almost an inch through, and almost empty; a yellow ulcerated patch three inches in circumference, and a black elevation, size of fist, containing clotted blood, near apex; mucous membrane of intestines seemed healthy.

Upon inferior or external surface of spleen were about ten dark, solid, colored elevations about size of a quarter. Lived seven days.

## A LARGE ABDOMINAL TUMOR.

BY WM. R. CLAUSSEN, V.S.

August 22 Mr. Tom. Parker, of Iola, sent for me to attend a three year-old colt. I found her lying in the yard evincing symptoms of abdominal pain. Mr. Parker told me the animal had been bought two months previous, had never been sick, was a free driver, and a good feeder. During the last two weeks Mr. Parker had noticed the colt stretching as if making an effort to urinate, but as urine was freely passed and she ate well, no attention was paid to this. He also noticed that when turned loose with her mate, she would never kick and run, but simply trot off at a good speed; this, he thought, was because the colt was of a very kind and quiet disposition. In the harness she was all ambition and had often covered a mile in five minutes. Examination revealed nothing but great quantities of fæces, of which nothing of any consequence had been passed during the last twenty-four hours. Temperature  $101\frac{1}{2}^{\circ}$ , respiration normal, pulse firm and a little accelerated,  $1\frac{1}{2}$  gr. eserine and 1 gr. philocarpine were administered. In thirty minutes fæces were freely passed and continued to pass at intervals for about two hours. The animal appeared relieved, and I left, instructing Mr. Parker to telephone me if the colt should be taken worse. This was at 2 P. M. The horse was taken sick again at 11 P. M., but soon got quiet; the pain returned at intervals through the night; the horse, during these spells, tried to place herself on her back. At 2 A. M. she broke out in a cold sweat and commenced to vomit, which was kept up uninterruptedly through the night till 6 A. M., when she reared and fell dead. At the autopsy a tumor, weighing six pounds, was found on the mesentery close to the jejunum, about fourteen inches from the pyloric orifice. The tumor was heart-shaped and consisted of a hard, glistening white mass, but covered with a soft hyperæmic membrane, which formed a fringe about two inches wide along the centre of the growth. At the broadest part, the base, I detected fluctuation and found about half a pint of thin, cream-colored, foetid pus in a multilocular cavity. The mesentery around the

tumor was hyperæmic and very much thickened. In the stomach I found a rent about one and one-half inch long. The small intestines contained nothing but water, the cœcum and colon were filled with food, the floating colon and rectum were empty.

Three years ago I found a tumor, now in possession of the Chicago Veterinary College, suspended from the mesentery of a mare a few inches from the pyloric orifice in such a way as to cause constant friction on the wall of the small intestine, which was very much thickened and the canal contracted to such an extent as to barely allow the passage of a goose quill.

These cases have suggested a thought to my mind. We, as veterinarians, are often called on by intending purchasers to examine horses as to soundness. Do we realize what that means? do we realize the responsibility imposed on us in this way? Suppose these horses to have been of pure-bred trotting stock, for which was demanded fancy prices; suppose a veterinarian had been sent to examine them with instructions to buy if they were sound as they appeared to be three weeks before death. Examination would have revealed nothing to the contrary. These tumors could not be felt by outward manipulation nor by exploration by rectum; and the horses would probably have been bought. What would have been the consequences concerning the veterinary surgeon? Would he be responsible to the purchaser for the sustained loss? This, of course, is a question of jurisprudence, but very closely affecting the veterinary surgeon.

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#### AMPUTATION OF THE UTERUS IN A COW.

BY THE SAME.

An operation similar to the one described on page 174 of THE REVIEW was performed by me on a cow. The uterus had been expelled some time through the night, and was fearfully lacerated. Reduction was out of question, so amputation was decided on. A strong hemp cord was passed several times around the pedicle close to the vulva, and the organ

removed, leaving a stump about three inches long. This was carefully washed, covered with iodoform and returned. The first day the animal showed colicky pains, and refused to eat; the second day she ate some, and ruminated along towards evening. Weak solutions of carbolic acid were injected into the vagina, and small doses of salicylic acid administered in the drink for a few days. The ninth day the cow was sent to the pasture, the ligature having come away and the cow appearing perfectly well.

## SOCIETY MEETINGS.

### UNITED STATES VETERINARY MEDICAL ASSOCIATION.

The 26th annual meeting of the United States Veterinary Medical Association was held at Wilson Building, Brooklyn, New York, on the 17th of September, 1889. President Huidekoper convened the session at 11 A. M., and on roll call the following members responded to their names: Drs. Barrows, Benis, Geo. Bridges, Burden, Clement, Coates, Cuff, Dixon, Wm. Dougherty, Faust, Goentner, Gill, Hopkins, Hoskins, Howard, Huidekoper, Lyman, Lowe, Michener, Miller, McLean, R. A. McLean, Middletown, Mustoe, McKee, Newman, Pendry, Jas. L. Robertson, A. K. Robertson, Wm. Rose, Tho. B. Rayner, Stickney, Winchester, Wray, Weber.

The recommendations of the Comitia Minora were, on motion, approved, including the election of the following list of new members: Dr. E. A. Parsons, New York City; Dr. W. T. Russell, Nashua, N. H.; Dr. H. P. Eves, Wilmington, Del.; Dr. J. A. Lathrop, Binghamton, N. Y.; Dr. A. T. Hummel, Philadelphia, Pa.; Dr. Daniel Leway, Fort Leavenworth, Kas.; Dr. G. R. Hartman, Philadelphia, Pa.; Dr. F. L. Russell, Avona, Me.; Dr. A. G. Hill, East Boston, Mass.; Dr. H. B. Adair, Kansas City, Mo.; Dr. W. H. Bronnell, New Bedford, Mass.; Dr. W. H. Hitchings, East Somerville, Mass.; Dr. S. Atchison, Brooklyn, N. Y.; Dr. R. S. Stanwood, Freehold, N. J.; Dr. Robt. Richards, New York City; Dr. Frank Merant, Greenfield, N. Y.; Dr. F. C. Herbert, Marlboro, N. J.; Dr. Wm. A. Birch, Philadelphia, Pa.; Dr. Thos. E. Maloney, Central Falls, R. I.; Dr. Wm. F. Walsh, New York City; Dr. R. T. Churchill, North Bergen, N. J.; Dr. G. Grimshaw, Kingston, Canada; Dr. Wm. Wappell, Pleasant Valley, Pa.; Dr. Chas. J. Weidner, Hilltown, Pa.; Dr. Sam'l W. Mathews, Warra, Pa.; Dr. Porte Crego, Sugar Grove, Ill.; Dr. G. G. Pearson, Philadelphia, Pa.; Dr. Hy. Van der Roost, Mount Vernon, N. Y.; Dr. W. H. Kelly, Albany, N. Y.; Dr. W. H. Robertson, New York City; Dr. Chas. H. Mackey, New York; Dr. I. F. Page, Manchester, Vt.; Dr. E. M. Osborne, East Hampton, L. I.; Dr. Chas. H. Perry, Brooklyn, N. Y.; Dr. Jas. S. Gilbert, Portland, Ind.; Dr. Geo. A. Roberts, East Shelby, N. Y.; Dr. S. S. Moyer, Hilltown, Pa.; Dr. W. B. Prothera, Horton, Pa.; Dr. August Jasme, Atlanta, Ga.; Dr. B. G. Orlopp, Indianapolis, Ind.

The names of Dr. T. W. Spranklin, Baltimore, Md., and Robert C. Jones, Port Jefferson, L. I., were ordered to be stricken from the rolls for violation of the code of ethics.

The Treasurer's report, showing a balance on hand of \$694.18 was ordered spread upon the books. The Secretary reported the collection of \$478.00 in dues and initiation fees, and an expenditure of \$426.75 during the past year.

Under the head of Reports of Committees, Dr. W. J. Coates, Chairman of

Committee on Intelligence and Education, made a very suggestive commentary on the various movements throughout the veterinary world, and what should be the duty and work of this Association. The report was received and referred to the Publication Committee.

Dr. Clements, Chairman of the Committee on Contagious and Infectious Diseases, made a voluminous report on the extent of these diseases in the United States, touching upon the whole category in a very suggestive manner. He urged the dropping of the terms contagious as applicable to a certain line of disease, and the substitution of the word miasmatic.

The Committee on Revision of the Constitution and By-laws offered the result of their work, making a complete remodeling of the old plan and after a few alterations it was adopted and ordered printed.

There were fifteen applicants for membership, and the names of Prof. J. H. Raymond, Brooklyn, N. Y., and Prof. H. M. Biggs, New York City, offered for honorary membership.

At 1 P. M. the Association adjourned for one hour to partake of a lunch generously prepared for the Association by the Long Island Veterinary Medical Association.

The election of officers for the ensuing year resulted in the following choice: President—Dr. C. B. Michener, New York City; Vice-President—Dr. A. W. Clements, Baltimore, Md.; Secretary—Dr. W. Horace Hoskins, 12 South 37th street, Philadelphia, Pa.; Treasurer—Dr. Jas. L. Robertson, New York City.

The newly elected officers were then escorted to their chairs, and, on retiring from the chair of President, Professor Huidekoper gave one of the most thorough reviews of the twenty-five years' work of the Association that has ever been prepared. He did not believe that the work of representing the profession in the United States had been as fully performed as the responsibility demanded, neither did he think that the field had been properly covered or the national question of importance to the veterinary world so handled as to make the Association a force and power in the country. His resumé bristled with just criticism, and its study and consideration by each member should be weighed, and better results will be brought forth in the next quarter of a century.

Dr. Michener then accepted the honor placed upon him in fitting words, pledging his untiring efforts in promoting the welfare of the Association and the betterment of the profession.

The President appointed Drs. Winchester, Howard and Stickney a committee to draft suitable resolutions on the deaths of our late members, Dr. E. F. Thayer, Newton, Mass., Dr. Chas. L. Moulton, Washington, D. C.

Dr. C. P. Lyman offered the resolution for the establishment of a central legalized body of veterinarians in this Association. The matter was referred to a special committee, consisting of members Lyman, Huidekoper and Jas. L. Robertson, to report at the next meeting.

Dr. Faust had an ably prepared paper on veterinary history of the different ages, but the lateness of the hour compelled its incomplete reading, and, on motion, it was referred to the Publication Committee.

The future meetings of the Association will be but once a year, and will be for two or more days in September, which new feature promises a wider range of better work for the profession.

The meeting adjourned at 7 P. M. to partake of one the most sumptuous banquets of good things, enriched and enlivened by a list of toasts, responded to by Prof. Raymond, Drs. R. S. Huidekoper, Stickney, Hoskins, Michener, Berns, Hon. Harry A. Moore, and others, well and wisely directed by the popular and genial toast-master, Dr. W. B. E. Miller, after which, to the strains of pleasant music, the banqueters separated, voting it one of the most important and successful meetings in the history of the Association, and highly complimentary of the untiring zeal and energy of the local committee of arrangements of the Long Island Veterinary Medical Association.

W. HORACE HOSKINS, Secretary.

## PENNSYLVANIA STATE VETERINARY MEDICAL ASSOCIATION.

The semi-annual meeting of the Pennsylvania State Veterinary Medical Association was held on Sept. 3rd, 1889, at Pottsville.

The meeting was called to order by the Vice-President, Dr. Jas. B. Raynor, in the absence of the President.

On roll call, the following members responded: Jas. B. Raynor, Thomas B. Raynor, Kooner, Harger, Sallade, Hoskins, Schaufler, John B. Raynor, Custer, Phillips, Webster, Hart, Blank, Weber, Collins.

The minutes of last meeting were, after a few minor corrections, adopted.

The following names were proposed for membership: Drs. D. C. Stanton, Factoryville; John C. Foelker, Allentown; Geo. Magee, Uniontown; W. H. Larrabee, Susquehanna; Henry Pierman, Mahanoy City; W. G. Friederici, West Pennsylvania.

The Board of Censors favorably reported Drs. D. C. Stanton, John C. Foelker, and George Magee, and they were elected members.

The Legislative Committee, through its chairman, Dr. Hoskins, reported the scope of their work and the successful passage of the bill in the State Legislature. He further reported the work of notifying every veterinarian in the State to register, so entitled, and to each prothonotary of the several counties of the State, the manner and just construction of the law. The decision of Prothonotary Mann, of Philadelphia, was mailed to every officer in the State, and every means adopted to secure a fair registration. He reported already numerous false registrations in different counties of the State, and gave notice of the Committee's intention to prosecute. He advised the raising of a large sum of money for this work after the last day of registration on October 11th, when the Committee proposed to secure able counsel, and county by county to endeavor to have the lists purged of all false registrations. The Association agreed to be responsible for the sum of five hundred dollars for this work, and more if it was needed.

Dr. W. S. Hooker, Corresponding Secretary then in perfect detail, gave a report of the work done, the number registered in each county of the State. He exhibited in tabulated form every county in the State, and spread before the Association the results of the most exhaustive work ever done in the management of veterinary legislation. The report was received, ordered to be spread upon the minutes, and a hearty vote of thanks tendered him for his services.

Plans were matured for very aggressive work in the matter of registration during the coming six months.

The day having been almost entirely consumed in the consideration of legislative work, but little time was left for the consideration of papers and reports.

Dr. C. J. Blank, of Easton, Pa., reported a very peculiar case. The animal, a gelding, was found suffering with colicky pains, for a number of hours, and many attempts to urinate, which was relieved by passing the catheter, only to recur again in a few hours. After some time the attempts at micturition recurred, and a closer examination revealed in the urethra a worm, some five or six inches long, resembling in appearance the intestinal round worm which infest the small colon.

The report gave rise to many conjectures as to this unique case, and to its method of reaching the point named. The worm was exhibited in a bottle, and the writer of the report was advised to place it in the hands of an expert, for the purpose of studying its proper classification and family.

After some other minor work the meeting adjourned.

W. HORACE HOSKINS., Sec'y.

## VETERINARY REGISTRATION IN PENNSYLVANIA.

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*Dr. W. Horace Hoskins, Chairman Leg. Com., S. V. M. S. of Pa.*

MY DEAR SIR.—After an extended conversation with Col. Wm. B. Mann, Prothonotary of our Court of Common Pleas, in relation to the act of April 11th, 1889, entitled “An Act to Regulate the Practice of Veterinary Medicine and Surgery in Pennsylvania,” he has instructed his clerks to observe the following rules in relation to the registration of Veterinary Surgeons: 1st, In all cases where a person presents himself for registration as a graduate (under Section 1) he shall produce his diploma, and if it is in regular form and apparently genuine he shall be entitled to register as a graduate, but not otherwise. 2nd.—In all cases where a person presents himself for registration as an “existing practitioner” (under Section 2) he shall make affidavit to a detailed statement of the facts showing his right to such registration, *i. e.*: When he first assumed the title, how long he has been in active practice, where he has lived during that time, and where he has practiced, that he has been in practice for the five years preceding the passage of the act, if he has pursued a regular course of study, then when and where he studied, and who was his preceptor, and where his preceptor can now be found; and all other facts going to show his right to registration under the provisions of the act. Thus you will see that by a strict compliance with these rules your society will be able to trace each man’s antecedents, and ascertain whether or not his statement is true, and, if not true, to prosecute and enforce the penalty prescribed by the act,

Very truly yours,

EDW. W. MAGILL.

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## NOTICE.

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The American Academy of Medicine is endeavoring to make as complete a list as possible of the Alumni of Literary Colleges, in the United States and Canada, who have received the degree of M.D. All recipients of both degrees, literary and medical, are requested to forward their names, at once, to Dr. R. J. Dunglison, Secretary, 814 N. 16th Street, Philadelphia, Pa.

# AMERICAN VETERINARY REVIEW,

DECEMBER, 1889.

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## EDITORIAL.

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PREVENTIVE INOCULATION OF CONTAGIOUS PLEURO-PNEUMONIA.—Director Nocard's notice in the *Recueil*—Dr. Germont's and Mr. Loir's teachings—Dr. L. McLean's record—inoculation not a new thing in Australia—difficulties in the way of securing fresh virus—how to overcome them—demonstrations of the French scientists—Pasteur's methods of obtaining good material for inoculation—formation of a national (?) laboratory to provide it—a good thing for pathologists in this country—why do they not prepare fresh vaccine virus for this disease—and for others known to be amenable to vaccination? ARMY VETERINARIANS.—Is the subject at last assuming good shape?—are there prospects of something being accomplished?—action of the various associations—of committees—of commissions—personal efforts—Dr. Griffin at work—our suggestion of a sinking fund—its approval by many—subscriptions coming in—more looked for—list started. TO OUR SUBSCRIBERS.—Letters received—causes giving rise to them—the manner in which they are written—the symptoms of the trouble—the diagnosis and prognosis relating to it—remedy—pay your subscription promptly, or ——— no REVIEW.

PREVENTIVE INOCULATION OF CONTAGIOUS PLEURO-PNEUMONIA.—In one of his latest contributions to the *Recueil de Medecine Veterinaire*, Director Nocard reports that the practice of preventive inoculation has become very popular in Australia, a fact which he attributes to the teachings of Dr. Germont and Mr. Adrien Loir, who had been sent to that country to assist in the extirpation of the rabbit plague, which has developed into a source of such an incalculable amount of loss and annoyance to the farmers of that land.

It must not be supposed, however, that the practice of preventive inoculation is a new thing, either in Australia or elsewhere, our esteemed colleague, Dr. McLean, having, we

believe, had a long and extended experience in this form of prophylactic practice, attended with highly important and satisfactory results.

But although inoculation was not a new thing in Australia, it seems to have been so little practiced that it has been only with great difficulty that fresh virus could be obtained with which to operate when needed. The difficulties encountered were caused by the great distances which separate the herds; the large numbers of animals collected in single herds, and the stale condition of the liquid or of the diseased lungs from which it was taken, which were in fact, not seldom either inert or in a state of putrefaction, when delivered at their place of destination and required for use. Many farmers were so far influenced by these reasons as to object to the operation, which thus became to a considerable extent, practically ignored. But the subject has now received a new impulse, through the demonstrations of Drs. Germont and Loir, of the manner in which pure and effective cultures can be obtained, by employing the process recommended by Pasteur for gathering and preserving the virus, by collecting and keeping it in sterilized glass tubes, and thus securing matter so protected as to preserve its activity for five or six weeks. The result of this demonstration has been the foundation of a laboratory devoted to the culture and preservation of pure virus, and prepared to answer any demand that may be made from any part of the Australian territory.

May we not find a suggestion here which might be of profitable adoption nearer home? It may be true that the establishment of a depot for the supply of prophylactic virus is not really a necessity in the United States, but it is a little remarkable that there should be such a lack of facilities for obtaining the necessary virus for preventive inoculation as actually exists in this country, especially while there are other contagious diseases with which we are obliged to contend, and which may be prevented by inoculation, among which we may include anthrax under its various forms. Cannot some of our experienced pathologists who have laboratories under their control be induced to provide the various kinds

of virus necessary, or must we continue to deprive ourselves of the advantages which all over Europe are accessible to the profession, and suffer thousands of our cattle to perish in proof of our lack of interest in the welfare of our farmers, as well as in the progress of our science, to say nothing of our neglect of an additional source of income for the practitioner, now overlooked and unimproved.

ARMY VETERINARIANS.—It almost seems that this subject is at last likely to receive the attention to which it is entitled at the hands of the profession; that there is a possibility that the various agitations and propositions and suggestions of the past are destined to crystallize into some tangible and effective form, and that the many reports, bills and committee discussions having relation to it are to be in some way focussed into something effective and satisfactory. We shall be greatly rejoiced to see it demonstrated, that the work expended in the past upon this interesting question is at last to end in some tangible and worthy accomplishment. That it may truly be so, is sincerely to be hoped.

The address recently made by ex-President R. S. Huidekoper, before the United States Veterinary Medical Association, contains some very strong and pertinent remarks touching the duties of that Association relating to this important branch of the United States service, and at the suggestion of the newly elected President, Professor C. B. Michener, a strong committee was appointed, from whose action we may expect results of great value and importance. From Brooklyn we hear that a committee on the same subject has been appointed, we believe, by the Long Island Veterinary Society, whose young members are full of professional enthusiasm. All this promises well, but promises are not enough. A gentleman who has of late become prominent in the movement, Dr. Griffin, has, we understand, given up a good and lucrative private practice in order to join the army, where his acquaintance with the service and his already thorough experience of army veterinarian life may be perfected, and if we may judge of what he is able to do by what he has done already, we shall soon hear from him. There is also every

prospect that the subject will at last be brought before Congress during the coming session and some action procured.

Referring, on a former occasion, to the work which might be required, we suggested the establishment of a fund, by way of providing the "sinews of war," always an element of great usefulness, and an indispensable factor in every human enterprise. We have offered our humble subscription towards this fund, and in the present number open a list which we hope will have a rapid expansion. The amount will be placed in the hands of the Committee of the United States Veterinary Medical Association, unless otherwise directed by a majority of the subscribers. Who is the next?

SUBSCRIPTION LIST TO THE ARMY VETERINARIANS FUND.

AMERICAN VETERINARY REVIEW.....	\$25 00
G. Griffin, D.V.S., Eighth U. S. Cavalry.....	25 00
John Robertson, V.S., Second U. S. Cavalry.....	20 00

TO OUR SUBSCRIBERS.—We frequently receive letters asking for back numbers of the REVIEW, and others again complaining of irregular delivery and missing numbers, and these missives are too often composed in a style of phraseology not always very conducive to our own blandness of temper, and far from creditable to the writers' taste or good manners. The cause in many of these cases is that the persons who write thus have either failed to notify us of their desire to continue their subscription, or have ignored the little account mailed to their address. No paper can be printed and published as a matter of recreation, and for the mere pleasure of it. Compositors must be paid for their work, and if subscribers do not settle their bills promptly, the only remedy is, first to stop mailing the REVIEW to delinquents, and last to take the name from the mailing book. We have always had receipts enough to enable us to go on, and so long as we do not publish the REVIEW, as we do not, as a money making enterprise, we are satisfied and we will continue so. This fact, however, absolves no subscriber from his obligation to pay his annual subscription, and many of our friends are behind their dues, some for one and two years, and some for even a longer period. We take this opportunity

to remind them that bills have been sent to them, that the liquidation of their little indebtedness will always be agreeable to the publisher, whose unpleasant duty it will be in cases of defaulters to drop their names from our mailing list.

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## ORIGINAL ARTICLES.

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### TUBERCULOSIS.

BY M. ARLOING, Director of the Lyons Veterinary College.

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(Continued from page 355.)

#### II.—TUBERCULOSIS CONSIDERED IN ITS BEARING UPON ALIMENTARY HYGIENE.

M. Chauveau having demonstrated that when an ox ingests the lesions of human phthisis, comprising caseous pneumonia, it contracts a disease similar to natural bovine tuberculosis, one implicitly admits the identity of human and bovine tuberculosis, and the possibility of the contagion of bovine phthisis to man by ingestion. Indeed some instances very favorable to this opinion have been cited.

Hence it was of importance to protect our own species from the dangers to which the alimentary use of the milk and flesh of tuberculous bovines would expose it. Everywhere people have been engaged in considering the means of preservation, but the diverse solutions which have been presented have thrown over the mind and into the practice a confusion to which the present Congress will probably put an end.

##### *A.—The Flesh.*

A certain divergence of views regarding the nocuity of the flesh of tuberculous animals, and a lively concern on the part of agricultural interests, have produced the confusion to which we allude.

A simple historical retrospect of the question will make us conversant with this confusion and its causes.

*Historical Review.*—No one any longer doubts the transmissibility of tuberculosis by inoculation and ingestion of tu-

berculous lesions. (It is universally admitted that if one eats tuberculous organs raw, and even cooked (for cooking does not always destroy the virulence), one will be much exposed to contract tuberculosis.) But many persons think that, putting aside the tuberculous organs, the flesh, and especially the cooked flesh, may be eaten almost with impunity. Then, why withdraw from consumption a very considerable quantity of meat, and impose on agriculture, already greatly tried, a serious loss without any profit to alimentary hygiene?

Others believe that the flesh becomes dangerous in certain cases only. According to Gerlach these cases exist when "the disease, starting from a limited focus of tuberculosis, spreads itself more or less generally throughout the organism;" that is to say, when tubercular lesions exist in the lymphatic glands adjoining the organs attacked with tuberculosis, when the presence of caseous foci, notably in the lungs, indicates that there has been disintegration of these, when there has been secondary extension of the tubercles, and, finally, when there is evident emaciation. In Johne's opinion the flesh is dangerous only when generalisation of the tuberculosis has taken place, that is to say, when the tuberculous substance, passing the lymphatic system of the affected viscera, has gained the thoracic duct and the blood-vessels. Except in these circumstances, Gerlach and Johne recommend the rejection of the organs that present tubercular lesions, and the consumption of the remainder.

Hence arise three different systems of jurisprudence with regard to the carcasses of tuberculous animals slaughtered for food:—

1. That of allowing it to pass, guarded, however, by the recommendation to cook the meat well before eating it.
2. That of partial seizure.
3. That of total seizure in cases where the tuberculosis is generalised or accompanied by emaciation.

At the Brussels Congress, M. Lydtin proposed the third of these methods, deduced from the opinions of Gerlach and Johne. He brought forward the motion in the following terms:—

“ In order that the viscera of a tuberculous animal may be passed for consumption, it is necessary that at the moment of slaughter the disease should be still at its early stage (*debut*), that the lesions should have extended to only a small part of the body, that the lymphatic glands should still show themselves exempt from all the morbid lesions of tuberculosis, that the tuberculous foci should not yet have undergone softening, that the flesh should present the characters of meat of the first quality, and that the general state of nutrition of the animal slaughtered should leave nothing to be desired at the time of its being killed.”

But at the end of the meeting at which this motion was discussed, H. Bouley, under the influence of very legitimate dread, caused by some experiments of M. Toussaint, led the Congress to declare for the principle of total seizure in every case of tuberculosis, whatever might be the extent of the lesion and the apparent quality of the flesh.

Let us add, however, that the amendment of H. Bouley was adopted by only fifteen votes against fourteen, with nine abstentions. The question was in reality adjourned.

It was taken up again by the French veterinary surgeons on November 1st, 1885. In spite of a very animated discussion, in which M. Butel urgently demanded the adoption of H. Bouley's proposition, the Congress emitted a view slightly different from that made at Brussels by M. Lydtin.

The Congress for the Study of Tuberculosis in Man and Animals, initiated by our honorable and distinguished associate, M. Butel, held in Paris in the month of July, 1888, put at the head of its labors the study of the dangers attending the use of the flesh and milk of tuberculous animals.

There were heard some interesting communications, some having for object to diminish the fear which the use of the flesh of tuberculous animals inspires, others to show the danger under its true light, and the grave responsibility which would be incurred by sanitary agents who, against humanity, would persist in forgetting it.

After a long discussion the Congress passed unanimously, save for three votes, the following resolution: “ There ought

to be pursued by every means, comprising the compensation of those interested, the application of the principle of total seizure and destruction of all the flesh derived from tuberculous animals, whatever may be the extent of the specific lesions found on these animals."

The discussion offered two particularities which it is very important to note. It re-echoed the complaints of several veterinary inspectors of meat, who urgently demanded to be furnished with a simple, clear, and uniform line of conduct. Finally, by the presence of several foreign champions, it acquired the authority of an international debate. M. Bang, of Copenhagen, Thomassen, of Utrecht, Van Hertsen and Degive, of Brussels, Siegen, of Luxemburg, Robinson, of Greenock, and Cope, of London, pronounced for the withdrawal of the flesh of tuberculous animals from consumption. M. Thomassen even recalled that at the Congress of Hygiene at La Haye, held in the month of August, 1884, the absolute interdiction of the milk and flesh of tuberculous animals had been voted. At the same instant the *Journal Officiel* of the French Republic published the decree of the 28th of July, 1888, adding tuberculosis to the list of contagious diseases, and an order of the Minister of Agriculture prescribing the measures to be taken with regard to the flesh furnished by tuberculous animals.

The following are these measures:

"The flesh of tuberculous animals shall be excluded from consumption:

"1. If the lesions are generalized, that is to say, not confined exclusively to the visceral organs and their lymphatic glands.

"2. If the lesions, although localized, have invaded the greater part of an organ, or are manifested by an eruption on the walls of the chest or abdominal cavity.

"Such flesh excluded from consumption, as also the tuberculous viscera, cannot be used for the alimentation of animals, and ought to be destroyed.

"The utilization of the hide shall not be permitted except after disinfection."

We know, on the other hand, that analogous and even more severe measures have been specially taken at the slaughter houses of Berlin, and that there has been submitted to the Superior Council of Hygiene of the Kingdom of Italy a regulation to the effect that "the flesh of animals killed during disease—principally the flesh of those in an advanced state of emaciation—shall be absolutely eliminated from consumption, not only of man, but also of dogs and pigs."

We proceed to examine these different measures, and we ask whether they can give complete satisfaction, in form and in reality, to those who are concerned in the first place with the hygiene of man.

*Nocuity of tuberculous flesh.*—Let us at the outset prove very clearly the nocuity of the flesh coming from tuberculous animals. That has been demonstrated by two varieties of experiment: 1. The ingestion of the flesh of tuberculous animals, having all the appearances of healthy flesh; 2. The inoculation of the juice extracted from such flesh.

Of the first kind we shall content ourselves with citing a few. Those of Gerlach and of Johne are the most important. Out of thirty-five animals fed by Johne with the raw flesh from animals attacked with tuberculosis, 8, or 22.5 per cent. became tuberculous; and of forty-six subjects fed in the same manner by Johne, 13.1 per cent. contracted the disease.

M. Peuch caused two young pigs to consume five kilogrammes of raw flesh, without bone, in ten days. At the end of two and three months these animals presented discrete glandular tuberculosis.

M. Nocard caused eleven cats to be fed for from two to four days with a certain quantity of flesh from tuberculous animals without result; but these negative experiments cannot destroy the preceding.

Thus, the passage of suspected flesh into the digestive tube can communicate tuberculosis. Moreover, MM. Straus and A. Wurtz have shown in some experiments *in vitro* that the virulence of Koch's bacilli is with difficulty destroyed by the gastric juice.

The cooking to which food is submitted can diminish the

danger, but it is impossible to rely on that for the destruction of the virulence. In fact, to obtain this result, all the virulent particles would require to be heated to over  $70^{\circ}$  C. for half-an-hour. But in practice this temperature is not always uniformly attained and maintained throughout the whole thickness of the masses of flesh submitted to the cooking. Let us add, to complete the information on the role that may be attributed to cooking, that in sixty-two experiments in which Johne administered notoriously tuberculous flesh, after having submitted it to cooking in boiling water for ten to fifteen minutes, 35.5 per cent. of the animals were infected.

Experiments by inoculation of the juice of the meat, in which one, so to speak, compels the virus to enter the organism, may appear to some persons a little artificial.

The results, however, which they furnish are less alarming than those of the experiments in which the suspected flesh has been introduced naturally into the digestive passages. Sometimes, indeed, the results are almost reassuring. Thus, M. Nocard has obtained only a single example of infection in twenty-one series of inoculations made with the juice of the flesh of twenty-one cows seized in the abattoirs. But it must not be forgotten that the virulent bacilli are distributed with great irregularity in the muscular mass, that they are rare there, and that consequently they may pretty often be absent from the small volume of juice which serves for the inoculation of an animal. To appreciate the virulence of the juice of the flesh by inoculation, it is therefore necessary, as in statistics, to examine as many experiments as possible.

Last year, at the Congress for the Study of Tuberculosis, the experiments of MM. Nocard, Chauveau and Arloing, Galtier, Peuch and Veyssi re were cited. These experiments give a total of forty-seven attempts, nine of which were followed by tuberculization.

For these forty-seven attempts there were employed one hundred and thirty-seven animals, thirteen of which became tuberculous, giving a proportion of 9.4 per cent. for infection by inoculation ; while by taking the mean of the experiments by Gerlach and Johne by natural ingestion one arrives at the ratio of 17.8 per cent.

The two series of experiments converge then towards the same demonstration—the nocuity of the flesh of tuberculous animals, and they indicate, further, the fact, especially serious from our point of view, that contagion by the digestive passages operates with alarming frequency.

Calculation gives us an idea of the number of bacilli contained in the mass of muscle of a tuberculous ox.

Let us start from the experiments mentioned above, and suppose that the bacilli are uniformly distributed in the muscles of a tuberculous animal. Let us admit also that the one hundred and thirty-seven animals inoculated may have had each 1 centimetre cube of juice. In the 137 centimetre cubes there were at least thirteen bacilli, or for 1 centimetre cube  $\frac{13}{137}=0.094$ . We have assured ourselves that 100 grammes of flesh give under the press 30 centimetre cubes of juice. Consequently 100 grammes of flesh will include  $0.094 \times 30 = 2.820$  bacilli. A kilogramme will contain 28 bacilli. If an ox of medium size furnishes 280 kilogrammes of flesh net, its carcase will contain  $28 \times 280 = 7840$  bacilli. This number is not insignificant.

M. Nocard has endeavored to discover how long the bacilli wandering in the muscular tissue may conserve their virulence. Having inoculated six rabbits, two and one-half months old, with 1 centimetre cube of a culture of tubercle bacilli (non-sporulating), he killed the first at the end of two days, and the others at intervals of twenty-four hours. From each rabbit he removed the mass of the longissimus dorsi muscle, divided it finely, and submitted it to the action of the press in order to express the juice. A centimetre cube of this juice was inoculated into the auricular vein of a parallel series of test rabbits. The rabbits inoculated with the juice of the flesh of the first three rabbits died tuberculous; the three others were never affected.

M. Nocard concludes that the flesh of a tuberculous animal can offer some danger during the four or five days after death, but that after that interval, that is to say before the sixth day, the bacilli are destroyed in the muscular tissue.

This research, interesting from the scientific point of view,

is hardly reassuring from the point of view of practice. In the first place, it is generally within five days after slaughter that the flesh is retailed among the consumers, and within even a shorter period in summer. Again, the muscular tissue may very well destroy the non-sporulating bacilli, but does it destroy also the spores, such as are often present in the bacilli of tubercular organs? The question may be put and almost answered negatively, for otherwise one could not comprehend the development of some examples of tuberculosis of the muscles which science has recorded.

Several persons have inquired whether the flesh of animals that present some tubercular lesions, and are at the same time in a thriving condition as regards fatness, are really dangerous. Our friend, M. Baillet, of Bordeaux, has insisted that these animals enjoy a sanitary immunity.

M. Van Hertsen believes that such a tolerance would be followed by fatal consequences, for it is not in subjects of good appearance that the lesions are most discrete; he has seen in these animals the co-existence of pulmonary phthisis and mesenteric phthisis of a very advanced degree.

MM. Veyssière and Humbert are not content with theoretical considerations; they inoculated to two rabbits 1 centimetre cube of juice of flesh from a cow *in very good condition*; both animals became tuberculous. Consequently the bacilli of fat subjects would be no less dangerous than those of lean subjects.

It may be added that the flesh of fat subjects would have less chance of being sterilized by cooking, for that is what the consumer eats underdone (*saignantes*) in preference to the lean meat.

To sum up, the flesh of all tuberculous cattle, lean or fat, may conceal the germ of phthisis.

Now, do we know in what circumstances it encloses it and becomes infective?

Gerlach believed that he knew this when he said that "the flesh commences to be injurious when one can demonstrate by the traces that persist, that the tuberculous malady, starting from a limited tuberculous focus, has spread itself more or less generally throughout the organism."

Johne also believed that he knew it when he admitted that the flesh is not dangerous "as long as the animals killed for the butcher when attacked with tuberculosis do not present the characters of metastatic tuberculosis, that is to say, of generalized tuberculosis."

M. Lydtin, in indicating to us the characters which the flesh and the viscera of a tuberculous beast ought to present in order to be passed for consumption, states explicitly what are the conditions in which the flesh becomes injurious: it is injurious when the tuberculous focus has undergone softening, when the lymphatic glands are affected, or when the lesions have extended to a certain portion of the body.

We, also, thought that we could formulate these conditions when we said to the Sanitary Congress of Paris, in 1885, that "the flesh even of good appearance is dangerous whenever the tuberculous lesions of an organ or of a serous membrane have the tendency to become generalized, that is to say, have passed the afferent lymphatic glands of these organs."

The French legislator has equally considered that he knew exactly these conditions, since he prescribes the exclusion of the flesh from consumption "if the lesions are generalized, that is to say, not confined exclusively to the visceral organs and their lymphatic glands, and if the lesions, although localized, have invaded the greater part of an organ or are manifested by an eruption on the walls of the chest or of the abdominal cavity."

There are so many hazardous pretensions. It is easy to prove that, in informing oneself regarding the propagation of the tuberculous virus in the organism.

Undeniably the muscles can be dangerous only if Koch's bacilli circulate in their substance with the blood. But they are found in the blood-vessels at the outset of infection, as well as in the course of an advanced infection.

The bacilli do not necessarily travel, from their point of entrance towards the organs where they fix themselves, only by way of the lymphatics. Indeed their passage in the lymph is not indispensable to their ulterior fixation. When intro-

duced into the connective tissue the bacilli divide themselves unequally between the blood and the lymph, and find their way into the lymphatic glands, the parenchymatous organs, and the serous membranes; these manifest their presence at first in the points which show themselves most favorable to their stagnation and to the development of the process that they engender.

Tuberculization of the lung occurs in the rabbit as well after inoculation of the virus into the jugular vein as into the subcutaneous connective tissue of the thigh. And since in this animal the lymphatic path followed by the virus is not forcibly marked out by the tubercular lesions, it is impossible in the presence of a rabbit affected with pulmonary tuberculosis to know whether the bacilli are disseminated by means of the blood or the lymph.

Assuredly, when the virus penetrates by the intestine, the lymphatic glands are generally invaded in the first place, then the lesions extend to the serous membranes of the thoracic cavity; but the infection does not march invariably in this manner; it can evolve simultaneously in the abdomen and in the lung. In order to gain the organs rapidly the virus must be thrown into the blood at a very early period.

When the lesions are established in an organ, and have manifested themselves, it is not necessary that they should be either very extensive or softened in order to throw into the circulation a certain quantity of microbes. The sudden explosion of most cases of meningitis or of tubercular peritonitis coincidently with pulmonary lesions of slight extent and but little advanced, furnishes the proof of our assertion.

An animal that presents any tuberculous focus whatever is constantly in imminent danger of generalization, and nothing shows at the moment of slaughter for the butcher that the capillary network of the muscles is not traversed by the bacilli in search of a place propitious for their multiplication.

The distinction between a localized and a generalized tuberculosis is very difficult to draw.

The indication of a generalization is found in the presence of lesions of the lymphatic glands outside of the lymphatic system of the organs tuberculized.

But M. Merot, of Troyes, has observed these lesions with a very discrete tuberculization of the viscera. He has said that he has encountered the alteration of the lymphatic gland of the first intercostal space (inspector's gland of M. Van Hertsen), while the tubercles were very rare on the costal pleura, or were entirely absent there and showed themselves in greater or smaller numbers on the lungs. He has made similar observations regarding abdominal tuberculosis. He therefore recommends "inspectors of abattoirs to examine minutely the pectoral and abdominal lymphatic glands of every slaughtered animal brought in quarters and without the viscera, *even when the pectoral and ventral walls, integrally covered by their serous membranes, appear completely free from tubercles.*" In other words, there exist some examples of dissimulated generalization which must be carefully studied in order to distinguish them from cases of local tuberculosis.

When one searches thoroughly, one finds, like M. Veysi re of Rouen, that the cases of veritable local tuberculosis are very rare. In three years out of eighty-one cases of tuberculosis, this observer has encountered only two perfectly characterized. It may be remarked that these two cases of localized tuberculosis were perhaps in the way of being transformed into generalized tuberculosis at the moment when they were observed.

*(To be continued.)*

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## UNITED STATES VETERINARY MEDICAL ASSOCIATION.

### TWENTY-FIVE YEARS WORK REVIEWED.

An address delivered at the 26th Annual Meeting of the Association,  
by ex-President R. S. HUIDEKOPER, V. S.

*(Continued from page 364).*

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*Sixth Annual Meeting.*—The sixth annual meeting was held in New York, September 21st, 1869.

Resolutions of regret were passed at the loss sustained in the deaths of the former Presidents, R. H. Curtis and C. M. Wood.

It was resolved to substitute the word "members" in the constitution and by-laws wherever the word "fellow" existed.

Dr. Walter Burnham, of Lowell, Mass., was elected an honorary member.

It was resolved to petition Congress for an act of incorporation of the U. S. Veterinary Medical Association.

The Committee on Intelligence and Education reported that they found no papers in the hands of the Secretary worthy of publication. The following officers were elected: President, E. F. Thayer; Vice-President, I. Michener; Corresponding Secretary, O. H. Flagg; Recording Secretary, J. L. Robertson; Treasurer, C. Burden; Censors, R. Wood, J. H. Stickney, A. Liautard, W. Saunders, J. C. Walton and A. Large.

An interesting discussion took place at this meeting on "spaying of cows," Dr. Busteed claiming that the operation was first introduced by an American named Thomas Quina.(?)

*Seventh Semi-Annual.*—On March 15th, 1870, the seventh semi-annual meeting was called to order at Philadelphia, but no quorum was present.

*Seventh Annual Meeting.*—The seventh annual meeting was called at the College of Veterinary Surgeons in New York, on September 20th, 1870. The officers of the last year were re-elected. No papers appear to have been presented.

*Eighth Semi-Annual.*—The eighth semi-annual meeting held at Young's Hotel, Boston, March 21, 1871, was occupied only by discussion on the eligibility of candidates for membership.

*Eighth Annual Meeting.*—The eighth annual meeting, again at New York at the College of Veterinary Surgeons, on September 19th, 1871, was called to order by Dr. Thayer.

The following resolution was adopted and a copy sent to the Board of Trustees of the New York College of Veterinary Surgeons:

That the U. S. V. M. Association request the Board of Trustees of the N. Y. C. V. S. to have an examination of students before admission to the course of lectures, of such a

nature as may seem to them to further the object of a higher grade of education.

Fred. L. Thayer, M.D., was admitted as an honorary member. Peter Nostrand was admitted as a member. Drs. Stein, Weisse and Percy, members of the faculty of the N. Y. C. V. S., were admitted as honorary members, and Robert J. Saunders as a stated member. A ballott for officers elected:—President, A. Large; Vice-President, W. Saunders; Recording Secretary, J. L. Robertson; Corresponding Secretary, O. H. Flagg; Treasurer, C. Burden. Censors, R. Wood, J. H. Stickney, A. Liautard, W. Saunders, J. C. Walters and E. F. Thayer.

Dr. Liautard presented a paper on Cerebro Spinal Meningitis.

*Ninth Semi-Annual.*—The ninth semi-annual meeting held in Boston at Young's, March 16th, 1872, received a report from the Committee on Charter, stating that after legal advice they deemed it impracticable to obtain the same from the United States Government.

*Ninth Annual Meeting.*—The ninth annual meeting was called to order in New York at the College of Veterinary Surgeons, on September 17th, 1872. After routine business, Theo. K. Very and Robt. J. Saunders were elected members. Officers for the next year were elected as follows:—President, A. Large; Vice-President, W. Saunders; Recording Secretary, J. L. Robertson; Corresponding Secretary, O. H. Flagg; Treasurer, C. Burden. Censors, Messrs. R. Wood, Stickney, W. Saunders, E. F. Thayer, Walton and Liautard.

Dr. Thayer presented a case of Fistula of the Parotid Duct, and Cerebro Spinal Meningitis was discussed.

*Tenth Semi-Annual.*—The tenth semi-annual meeting was again held in Boston, March 17th, 1863, at which the death of Dr. Watson was reported.

*Tenth Annual Meeting.*—On September 16th, 1873, the tenth annual meeting was held in New York.

J. D. Hopkins, R. W. Finley and Peter Peters were elected members. The officers of the past year were re-elected,

except Messrs. Saunders and Walton, who were replaced by Messrs. Nostrand and Robertson, in the Board of Censors.

*Eleventh Semi-Annual.*—At the eleventh semi-annual meeting held in Boston on March 17th, 1874, it was proposed to donate fifty dollars in aid of the erection of a monument to the memory of Bourgelat at Alfort, France.

*Eleventh Annual Meeting.*—The eleventh annual meeting was not held owing to an error in the date of the notices which had been sent out.

*Twelfth Semi-Annual.*—The twelfth semi-annual meeting held in Boston, March 26th, 1875, seems to have been only a meeting of the *Comitia Minora*.

*Twelfth Annual Meeting.*—September 21st, 1875, was held at the American Veterinary College, A. Large, the President, in the Chair.

An appropriation was made for the monument of Claude Bourgelat.

A. Lockhart, New York, Chas. P. Lyman, C. H. Stocker, J. Gadsden, Chas. Michener, Philip Fernsler, John Meyer, Jr., C. T. Bell, E. Travers, John B. Cosgrove, Richard P. Blakeley were admitted as members.

At the election of officers the following were chosen:—President, A. Liautard; Vice-President, T. S. Very; Corresponding Secretary, C. P. Lyman; Recording Secretary, J. D. Hopkins; Treasurer, C. Burden. Censors, R. Wood, Lockhart, Stickney, Flagg, Large, Robertson.

At this meeting it was ordered that two prizes be given each year to the best and second best paper on any veterinary subject. That a prize committee be appointed to confer with the winners as to their choice of prize—either as to medal, books, or instruments to the amount of fifty dollars. The Secretary notified the members of the above resolution. The Prize Committee consisted of Messrs. Large, Stickney and Lyman.

*Thirteenth Semi-Annual Meeting.*—Was held at Young's hotel in Boston, on March 21, 1876.

Dr. Thayer presented a paper on "Epizootic Aphtha," and Dr. Lyman one on "Internal Disinfection."

On April 28th, a special meeting was held at the Haynes House, Springfield, Mass., at which an effort was made to prepare a Veterinary Exhibit at the International Exposition to be held in Philadelphia, which, however, appears to have been a failure.

*Thirteenth Annual Meeting.*—Was called to order at the American Veterinary College in New York, on September 10th, 1876.

Mr. Henri Bouley, General Inspector of Veterinary Schools in France, and George Fleming, F.R.C.V.S., Veterinary Surgeon, Royal Engineers, were elected honorary members.

The officers of the last year were re-elected.

This meeting was honored by the presence of Professor McEachran, of Montreal, and Mr. Duncan, who represented Prof. Smith, of Toronto, Canada.

It was resolved that a Journal be printed by the Association, semi-annually, January and July 1st, to be called the AMERICAN VETERINARY REVIEW, A. Liautard and A. Lockhart, Editors, to cost each member fifty cents per volume, balance of the expense to be paid from the Association funds.

The meeting adjourned to meet at the Continental Hotel, Philadelphia, September 20th.

The adjourned meeting was called at the Continental Hotel on the morning of the 20th. The President, Professor Liautard, in the Chair.

The following papers were presented:—Prof. Liautard, "History of Veterinary Medicine in the United States;" Prof. Law, "Zymotic Diseases, and the Duties of the Veterinary Surgeon;" A. A. Holcombe, "The Effects of Stimulants in Disease;" Prof. McEachran, "Sanitary Measures in Preventing Diseases in the United States and Canada;" Thomas S. Very, "Chronic Lameness in Horses;" E. F. Thayer, "Fistula."

The meeting was again called on the morning of September 21st, and was occupied with discussions of the papers of the previous day.

*Fourteenth Semi-Annual.*—Returned to Boston, March 20th, 1877.

It was resolved that the AMERICAN VETERINARY REVIEW should be published monthly and that the faculty of the American Veterinary College be added to the editorial staff.

It was resolved that all papers for the annual prize shall be presented to the President of this Association before the fifteenth of July of each year. A committee was appointed to petition Congress in the enactment of more stringent laws for the prevention of disease by the importation of cattle from foreign countries.

A number of cases of pathological specimens were presented, which was followed by a paper by A. A. Holcombe on "Spinal Meningitis."

*Fourteenth Annual Meeting.*—Was held at the American Veterinary College, September 18th, 1877.

Messrs. John Meyer, Sr., W. J. Coates, C. H. Hall, Geo. P. Peniman and C. H. Peabody were elected members.

C. P. Lyman was elected President; William Bryden, Vice-President; A. A. Holcombe, Recording Secretary; Ernest Traver, Corresponding Secretary; Chas. Burden, Treasurer. Censors: Messrs. Robertson, Lockhart, Stickney, Holcombe, Lyman and Liautard.

Dr. Liautard, the retiring President, in his address called special attention to the great step which had been taken in establishing a journal for the profession.

It was ordered that the editor of the AMERICAN REVIEW be allowed to spend an amount of money for advertising said REVIEW, said amount to be left to his own judgment. An assessment of \$5.00 per member was made to replace neglected dues and subscriptions to the REVIEW.

*Fifteenth Semi-Annual.*—Met at Boston, March 19th, 1878.

Communications were received from the American Veterinary College, Cornell University, Illinois Industrial University, Montreal Veterinary College and the Toronto Veterinary College in regard to the proposed Congress of American Veterinary Colleges, in which each seemed afraid that they would be called upon to meet the representatives of some college in disreputable standing, after which the Committee on Intelligence and Education were instructed to continue their efforts

toward calling a convention of the teachers of the various Veterinary Colleges of America, for the purpose of improving the standard of veterinary science and the curriculum of studies in said colleges.

Prof. McEachran was elected to honorary membership, and J. A. Brackin, J. C. Fries, J. C. Mallory and J. C. Fogg to be active members.

The editor of the AMERICAN VETERINARY REVIEW reported the condition, circulation, expense, etc., of said journal, and asked for the privilege of increasing the size and reducing its subscription price from \$5.00 to \$4.00; which was granted.

Dr. Bryden presented a paper on "Spavin," and Dr. Liautard on "Parenchymatous Injections." A large number of cases were also reported.

*Fifteenth Annual Meeting.*—Was held at the American Veterinary College, on Tuesday, September 17th, 1878.

The following new members were elected:—John F. Winchester, W. L. Schmidt, A. H. Rose, S. S. Field, W. H. Wray, W. Murphy, J. MacLaughlin.

The following officers were elected:—President, C. P. Lyman; Vice-President, W. Bryden; Recording Secretary, A. A. Holcombe; Corresponding Secretary, W. J. Coates; Treasurer, C. Burden. Censors: Messrs. Robertson, Lockhart, Stickney, Holcombe, Thayer, Liautard.

A number of cases were presented. Dr. Liautard read an article on "Melanæmia." Dr. Liautard was unanimously re-elected to the editorship of the AMERICAN VETERINARY REVIEW, and instructed to select such assistants as he chose, and to conduct the REVIEW in whatever manner would in his judgment best conduce to its success.

Dr. Holcombe presented a paper on "Acute Inflammation of the Air Passages and Pulmonary Emphysema," arising from inhalation of vegetable smoke.

*Sixteenth Semi-Annual.*—Was held at Young's Hotel on the 18th of March, 1879.

It was called to order by the Secretary in the absence of the President and Vice-President. Dr. Liautard was elected Chairman pro. tem.

It was ordered that after the next Annual Meeting this Association pay to the Secretary an annual fee of \$20.00.

*Sixteenth Annual Meeting.*—Was held at the American Veterinary College, September 16th, 1879.

Messrs. O. C. Frailey, R. M. McLean, W. B. E. Miller and T. J. Herr were elected members.

The following officers were elected:—President, J. L. Robertson; Vice-President, J. H. Stickney; Recording Secretary, A. A. Holcombe; Corresponding Secretary, W. J. Coates; Treasurer, C. Burden. Censors: Messrs. Liautard, Lyman, Lockhart, Thayer, Coates and Michener.

Dr. Hopkins presented a paper on "Contagious Pleuro-Pneumonia." Dr. Liautard presented one also on "Rupture of the Flexor Metatarsi."

The Committee on Prizes reported that two papers had been presented, but that they had determined to give no prize to either author, and recommended the return of the papers to their authors. Dr. Michener presented one on "Cerebro Spinal Meningitis."

A committee was appointed to draw up a set of resolutions to be presented to Congress in relation to the investigation and prevention of contagious diseases of domestic animals. This Committee met on Tuesday, November 9th, at the Hotel Royal, New York City, and again in December at the American Veterinary College, when the petition relating to animal diseases was completed, of which 600 copies were printed and sent to members of Congress, to the heads of Departments of the Government and to members of the Association.

*Seventeenth Semi-Annual.*—Was held in Boston on March 16th, 1880.

F. S. Billings, W. J. O. Sullivan, Chas. Winslow, Wm. L. Zuill, Walter H. Hornblower, Edgar P. Wing, Herbert T. Foote, Thos. C. Cowhey and Geo. H. Bailey were elected members.

Dr. Peabody presented a paper on "Chloral Hydrate" as an anesthetic in operations.

*Seventeenth Annual.*—Was held at the American Veterinary College on September 1st, 1880.

H. B. Boyd, W. H. Gryce, A. P. Weeks, R. Hall, P. Z. Colsson and J. Gerth, Jr., were elected members.

J. L. Robertson was elected President; O. H. Flagg, Vice-President; C. B. Michener, Secretary; C. Burden, Treasurer, and Messrs. Liautard, Lyman, Lockhart, Thayer, Coates and Michener, Censors.

Dr. Liautard presented a paper on "Osteo Sarcoma."

*Eighteenth Semi-Annual.*—Was held in Boston, March 13th, 1881. Drs. E. Hanshew, D. Cochran, and Thomas Lockwood were elected members. A communication from Dr. Holcombe in relation to Veterinary Medicine in the U. S. Army, was one of the foundation stones in the agitation of this subject in the country.

A Committee upon Army Legislation was appointed, consisting of Drs. Michener, L. McLean and Bryden.

Dr. Peabody presented an essay on "Phthisis Pulmonaris Verminalis."

Dr. Robert Wood read a paper on "Sarcocele."

The resignation of Prof. Liautard as editor of the AMERICAN VETERINARY REVIEW was accepted. The Association then tendered to Prof. Liautard, free of all encumbrance, the AMERICAN VETERINARY REVIEW as a slight recognition in respect to the labor he had done for us and the perfection of the paper. Dr. Liautard accepted the gift with the assurance that he would strive not only to keep the REVIEW up to its present standard, but would improve it whenever possible.

*Eighteenth Annual Meeting.*—Was held at the American Veterinary College, September 20th, 1881.

Drs. John Dougherty, R. H. Harrison, M. Bunker, J. E. McNichol, D. J. Dixon, W. W. Burth, Jos. Bushman, and F. H. Osgood were elected members.

At the election of officers:—Wm. Bryden was the choice for President; L. McLean, Vice-President; C. B. Michener, Secretary; C. Burden, Treasurer; Drs. Liautard, Lyman, Lockhart, Saunders, Robertson and Michener, Censors.

The annual dues were reduced to \$2.00. The initiation remailing as before, \$5.00.

*Nineteenth Semi-Annual.*—Was again held in Boston, March 21st, 1882.

Fully one-third of the members were present.

John Duane, Jr., and F. W. McClellan were elected members.

Dr. Thayer presented a paper on "Osseous Nasal Polypus," which was followed by a general discussion on diseases of bone.

*Nineteenth Annual Meeting.*—Was held at the American Veterinary College, September 19th, 1882.

Drs. Fred Saunders, Chas. L. Moulton, F. Traver, S. Kent, Jr., L. H. Howard, H. W. Atwood, W. C. Deboe, W. Dougherty, J. L. Leighton and W. A. Sherman were elected members. The officers of the past year were re-elected.

Dr. Liautard presented a paper upon inoculation for anthrax. Dr. Stickney and Miller presented cases.

*Twentieth Semi-Annual.*—Was held in Boston, March 20th, 1883. Drs. F. H. Frinck, J. Hawkins, Andrew Sharp, A. F. Newton, L. M. Crane were elected members.

The Comitia Minora were delegated power to appoint a Representative to the International Veterinary Congress to be held at Brussels.

A number of cases and specimens were presented by Drs. Bryden, Stickney, Michener and Howard.

*(To be continued).*

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## THE DIARRHŒAS OR "SCOURS" OF NURSLINGS: COLTS, CALVES AND LAMBS.

BY G. ARCHIE STOCKWELL, M.D., F.Z.S., Member of New Sydenham Society (London).

*(Continued from page 374).*

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Another phase also is presented, when we consider the character of these insoluble varieties. Mucous is mixed with all cheap pepsins during their preparation, and upon drying, rapidly undergoes decomposition, such being the result of the action of ptomaines. Now the decomposition of mucous procures *cadaverine*, one of the most poisonous of all the animal alkaloids, and the effect of administering an insoluble

pepsin to an animal whose entire alimentary canal is in an irritated and abnormal condition, can well be imagined.

The pancreatin secretion consists of a combination of four distinct ferments, which seem happily designed to supplement and complete the work left unfinished by the secretions of the parotid and submaxillary glands and the stomach : first, amyl-opsin, similar in action to diastase, converting the starch into dextrin and sugar ; second, a curding ferment, acting on milk in an analagous manner to rennet, or the curding ferment of gastric juice ; third, trypsin, having powerful peptonizing properties ; and, fourth, steapsin, known as the fat-splitting or emulsifying ferment. The chief of these ferments, and the one of paramount importance, is trypsin.

Pancreatin, which represents all these ferments, has an extended range of activity, and, unlike pepsin, acts in an alkaline medium, and is usually advantageously prescribed in connection with a soda ; for like reason also, pancreatin and pepsin should not be prescribed together, but the former should precede, and the latter follow, the taking of food.

In the diarrhœas of ruminant sucklings, the best results of pancreatin and pepsin are secured when the little sufferer is removed from the dam, and hand-fed with milk that has been rapidly and artificially cooled and duly diluted with cold water previously boiled. It may, further, seem advisable to remove a portion of the cream from the milk, substituting instead a small amount of some farinaceous product, such as roasted malt or flour ; the fact has long been recognized that bland and easily-digested farinaceous substances, mixed with milk, aid in preventing casein from forming large and firm masses in the stomach, by mechanically separating its particles. This insures more even feeding and better action of the digestive ferments. With the food may be administered pancreatin ; after feeding pepsin, if required ; between feedings, alteratives, antacids and anti-ferments may be employed. Acid lactic or carbolic, creasote, thymol and iodine, are especially valuable as antiseptics, but must be given separately, and in small and oft-repeated doses, to secure satisfactory results. Naphthalin or mercury deuto-iodide answer a like purpose,

but are less soothing to the irritated intestinal tract; and when severe pain is present, salicylic acid is often advantageously substituted. Marked tenesmus, however, is better relieved by chloral-hydrate, or analgesin, perhaps in connection with wild yam, either of which anæsthetize the intestinal tract, and at the same time in no way interfere with its normal functions other than by decreasing peristalsis; both also are antiseptic to greater or less degree, proportionately to the doses employed.

In the majority of cases, pancreatin, or pepsin (or both, as occasion demands), is all sufficient to relieve diarrhœa and restore healthy secretions. When the pancreatic fluid is wholly and normally restored, abnormal fermentation becomes impossible; and the biliary secretions are brought in accord therewith by the action of some mild alterative, as leptandrin or euonymin, or better yet, hydrastin combined with ipecac in minute doses, along with cerium oxalate.

Pancreatin should, as before remarked, be administered a few moments prior to feeding, or, in other words, before the secretion of acid-liquid and pepsin has been provoked in the stomach by the presence of food or peptogens. The object to be thus gained is, to remove the pancreatin from the possibility of destruction, and into the duodenum where it exerts its action, and where it properly belongs.

“Peptonized” or pancreatized milk is unsurpassed in the prophylaxis of scours in young lambs and calves, and is also a valuable adjuvant in the management of the malady. It cannot be too highly extolled where epizootic fluxes threaten, since the casein contained is transformed into flakes that are rapidly digested, causing no suffering or gastro-intestinal irritation. It may be prepared by adding two or three teaspoonfuls of liquid pancreatin, or five grains of “pure pancreatin” to a gill of cold, boiled water in which has previously been dissolved a scruple of bicarbonate of soda, and adding to a pint of milk warmed to 110°–115° Fhr. This mixture should be set in a warm place until the opaque whiteness of the milk gives way to a grayish color, or a slight bitterness develops, when it may be removed to the ice-box, spring-

house, or otherwise rapidly and artificially cooled, in order to suspend further digestive action. It should be used before many hours have elapsed, as it does not keep long; or, better yet, made fresh as required. When farinaceous additions are to be made, if roasted, they are best stirred in the milk when the latter is warm. Another equally good plan, one by which the roasting is avoided, is to make into thick gruel by boiling, subsequently thinning one-half, and adding to the peptonized milk in the proportion of one to four or eight of the latter. "Pure pancreatin," so called, is a misnomer, since that which is sold under the name is simply a highly concentrated preparation containing the various digestive ferments of the pancreatic secretion; such title is of empiric origin. I give the preference to Parke, Davis & Co's pancreatin, because of its definite, known strength, five grains of which, with a scruple of soda in half an hour completely peptonizes a pint of milk at a temperature of from  $110^{\circ}$  to  $115^{\circ}$  Fhr. If such proportion of pancreatin to milk fails to peptonize, it is *prima facie* evidence of the utter worthlessness of the ferment employed.

Heat is not necessarily a concomitant of the pancreatizing process; if preferred (and it is sometimes advisable), the milk may be diluted with half its volume of lime water, pancreatin being added in the proportions above given, and the mixture allowed to stand for three or four hours at an ordinary temperature, occasionally stirred. Peptonized milk, however, must not be considered as meeting all the indications of treatment in all cases of scours, for such, far from being a remedy, is oft-times of value chiefly as a food that can always be made of like quality, and administered in such quantity and frequency as the individual case demands; on this account it is more nourishing than milk from the maternal udder, and much more acceptable to irritated and inflamed digestive tracts.

Pepsin, when administered, should follow the food by perhaps thirty minutes, and is often advantageously given in a little weakly acidulated fluid, since there are several peculiarities in the action of remedies upon ruminants (more especially adults), chiefly referable to the construction of the stomach in four divisions, only the last one of which (aboma-

sum) corresponds to the single stomach of horse and man. It is advisable, especially when the afflicted creature is inclined or accustomed to nibble solid food, that all remedies be administered in suspension or fluid form : also it is usually advisable to add some stomachic to each dose to excite the action of the rumen, and insure the quick passage of its contents, as well as the dose administered, to the abomasum. For this reason, when pepsin is administered to calves and lambs, the so-called *concentrated glycerole* of the remedy is preferable, one minim of which, as prepared by Parke, Davis & Co., is supposed to be capable of digesting one hundred grains of albumen in the stomach. By its aid the difficulty of making durable liquid preparations of pepsin is overcome. Thus :

R	Glycerole of Pepsin (P. D. & Co.'s)	160 minims.
	Hydrochloric Acid, U. S. P.	30 minims.
	Glycerin,	5½ drachms.
	Water, sufficient to make	16 ounces.

This forms a very satisfactory solution, possessing slightly acid reaction.

Also an *elixir* of pepsin may be made equally efficient, and of like reaction, and is most available for ruminants because of the combined stomachics.

R	Glycerole of Pepsin (P. D. & Co.'s)	640 minims.
	Hydrochloric Acid, U. S. P. (or Lactic Acid, 50 m.)	30 minims.
	Water,	2 drachms.
	Aromatic Elixir, sufficient to make	16 ounces.

Each fluid ounce of this elixir contains the equivalent of forty grains of "Saccharated Pepsin," U. S. P., or, in other words, one grain of pure pepsin. The dose of liquid pepsin, as above prepared, is from a drachm to an ounce for suckling colts and calves, and from a quarter to half the dose for lambs. The elixir is just four times as strong in pepsin, and the dose may be regulated accordingly ; but it must be remembered also that doses are to be regulated largely by the size and condition of the animal, and the quantity and quality of the food supplied. Powdered pepsin may be employed in doses of one grain and upwards ; and pancreatin in twice the quantity for the larger animals, and approximately half the dose for lambs. For many reasons, the so-called saccharated products are best altogether ignored.

## REPORTS OF CASES.

*"Careful observation makes a skillful practitioner, but his skill dies with him. By recording his observations he adds to the knowledge of his profession, and assists by his facts in building up the solid edifice of pathological science."*—VETERINARY RECORD.

## A PECULIAR CASE.

By JAMES A. WAUGH, V.S.

I saw the following described case while on duty inspecting remount cavalry horses being bought under contract last year in Los Angeles, California. Brown horse, aged seven years, fifteen hands high, and owned by Arnold & Turman, cavalry horse contractors, who had obtained the animal from a liveryman in the city; then showed the horse to a cavalry officer, who was well pleased with it, and it was then taken to the government stables, where it was kept for about two months until the board of cavalry horse inspectors convened. In the meantime this animal suffered an attack of influenza, and A. T. Whittlesey, D.V.S., was called to treat it. A careful examination revealed a solution of continuity existing in the intercostal muscles in the cardiac region of the left side. The muscular lesion, or abnormality, was about five inches in extent and was situated between the sixth and seventh rib on the left side, and there was no evidence of any cicatrix in the common integument. The pulsations of the heart could be plainly seen externally and could readily be felt internally by introducing the entire hand into the thoracic cavity by pushing the skin into the breach in the intercostal muscles. The animal appeared in fine condition at rest, but respiration and circulation seemed somewhat impaired, and we never tested him in any exercise, as it was deemed unsafe to make any experiments with private property. The horse was presented to the board of cavalry horse inspectors on August 28, 1888, and we promptly rejected him. I afterwards saw this animal driven in a double team to a light vehicle, but did not have any opportunity to make any observations on the subject. I have consulted the works of Fearnley, Williams, Robertson, Gresswell, Law and other veterinary authors, also

my notes on Professor Smith's lectures, but cannot find anything concerning this morbid condition. Perhaps this article may be worthy of space in the REVIEW, where it may prove of interest to our profession. R. T. Whittlesey, D.V.S., W. E. D. Morrison, D.V.M., and myself, were inclined to consider this as a case of rupture of the intercostal muscles caused by some accidental injury received while the animal was being "broken" in true Pacific coast broncho style. However, it may have been a congenital condition. It may be well to remember these remarks whenever called to inspect valuable horses offered for sale or exchange.

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#### ULCERATED TEETH.

By DR. SUTTON, D.V.S.,

A duplicate of this case, with all of its surroundings, is unusual. In the city of Kalamazoo lives one of those horse-shoers and horse doctors combined. He is of a progressive turn of mind, and of late has added to his previous empirical title that of "Veterinary Dentist." His instruments consist of those of his own manufacture, which he can utilize for almost any purpose, and the greater part of his so-called professional work is with the unfortunate, the poorer class. Last autumn a poor but worthy young man called upon the so-called horse-doctor and dentist with a horse which had an enlargement on the inferior aspect of the lower jaw. This enlargement was characterized by two fistulous openings, corresponding to the second and third molar teeth. He injected his favorite remedies into these openings for about thirty days. Then it occurred to him to try his dental skill, and he forthwith attached his home-made forceps to the second molar, and with the assistance of two or three men broke it off at its entrance to the alveolus. With joyful glee he showed it to his friends as a remarkable piece of dental surgery. In a few days he proceeded in a like manner with the third molar with the same results. He now assured the owner that his horse would be all right in a few days. But the horse grew worse and the owner again sought the advice

of the horse doctor, who to his surprise told him the next molar would have to come out, and wanted to proceed at once to remove it. But the owner became discouraged and took his horse to a qualified veterinary dentist, who at once diagnosed the trouble as ulcerated teeth, the roots of which had been left in as above described. The dentist advised the removal of the roots as the only successful treatment. He accordingly trephined the jaw, and removed the roots with but little difficulty. The removal was followed with a satisfactory recovery.

Now herein lies the conditions that govern the reward. Kalamazoo is a beautiful city of twenty-five thousand inhabitants, with all modern improvements, such as street railways, electric lights, paved streets, colleges, churches, humane societies, etc. This queen Celery City also has the distinction of being the home of a United States Senator, United States Representative, a Federal Judge, ex-State Supreme Judge and ex-judges too numerous to mention. Yet with all of her accomplishments, this ancient horse doctor and dentist was allowed to sue the poor man for professional services, and with the advice and testimony of his medical adviser, who signs himself a graduate of the Ontario Veterinary College and honorary member of the Royal Society of Veterinary Surgeons, obtained judgment for the same with interest from date. And to add to this already ignominious proceeding, one of our leading morning papers came out, saying that the plaintiff's attorney showed a wonderful knowledge and skill of the anatomy of the horse, and claiming to have established the valuable precedent that *professional bills* must be paid.

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#### OBSTINATE CONSTIPATION—RUPTURE OF THE COLON—DEATH.

By D. K. LIGHT, D.V.S.

A dark bay gelding, four years old, was taken with violent colic on the 12th of October, 1889, about ten o'clock A.M., at which time I was sent for, but being absent, order was left to call to see the horse immediately on my return home, which occurred at five o'clock P.M. When first seen he was lying

upon his side, head and legs extended, and grunting or moaning, evidently enduring great suffering. He was urged to get upon his feet, which he readily did; examination revealed a pulse of 60 per minute; temperature  $101\ 4\text{--}5^{\circ}$ ; rectal exploration revealed a large distended body a little to the right of the spinal column, and filling nearly the entire pelvic cavity. Thought first I had to deal with a distention of the bladder, but closer rectal manipulation cleared up all doubts as to distention of the bladder, as I was unable to outline it on account of its largeness, and also its rounded appearance posteriorly. During my examination the animal evinced no sharp or excruciating pain, but on being left to himself would soon lie down again and make few attempts to roll round, after which he resumed a sternal or flatwise position. Diagnosis; obstruction of the bowels, either by intestinal calculi or spasmodic contraction of the intestinal track. Prognosis guarded. Treatment. The owner informing me that he had given the horse one ounce of powd. aloes on the 11th of October at about noon, stated that he simply gave the physic because he thought he was a little more constipated than he should have been. I followed up the treatment with a dose of chloral hydrate, 3 drachms, 1-2 ounce bicarb. potash made up with a little linseed meal and administered in pill form; also gave enemas of warm water every hour for the first three hours, afterwards at longer intervals. I left the case at 12 o'clock at night, at which time he seemed much easier, drinking water and nibbling straw, which he had not done since he became sick. Left orders to look after him the remainder of the night, and administer enemas whenever pain would be manifested, as the enemas always seemed to give immediate relief. Saw the horse again on the morning of the 13th of October, he still having some pain, but at longer intervals, in the intervals of pain drinking a little and eating straw or hay, but no oats or bran mash; pulse 48; temperature  $101^{\circ}$ ; rectal exploration revealed the large body much diminished, at which time could easily detect the feces in the gut feeling doughy to the touch, while on the previous day it felt more like a distended bladder. During all this time a large amount of gas escaped from

anus at intervals, but very little feces. After waiting patiently for forty-eight hours for the response of the aloes, and not receiving any, I began to be suspicious of the owner in regard to the administration and kind of aloes. The owner having bought two ounces of aloes not long ago, as he said, showed the remainder of aloes, which disclosed it to be powder. Cape Aloes, after which I immediately administered one pint of linseed oil, because no more expecting any response from the aloes; during the day had received two doses of a mixture of 1-2 ounce of sulphuric ether and 1 ounce of sweet spirits of nitrous ether at long intervals; left the case in the afternoon, at which time he seemed to be quite free from pain, drinking, and eating hay; left orders not to give too much hay, but grass instead, and plenty to drink, the horse not having physicked up to this time. I insisted on the owner seeing the horse the next day, which he barely consented to, because he thought the horse was all right. Again saw the horse for the third time on October 14th, at noon; at this time he seemed lively, eating and drinking well, with the exception of the mash, which he refused to eat much of. Examination: pulse 50, temperature 100°, respiration normal; did not make a rectal exploration; had passed some feces, urinated, etc., but had no actual physic, neither had I expected any. Gave stomach powder, to be given in half ounce doses during the day, and advised cautious feeding. Happened to meet the owner on the road on the 15th of October; inquired about the horse, and being told that he was doing very well with the exception that he still refused his mash or short feed more or less. On the 16th of October received notice that the horse was dead. I immediately proceeded to the place to hold a post-mortem examination. On my arrival the owner informed me that the horse had been all right on the evening of the 15th of October, but on coming to the barn on the morning of the 16th of October, found the horse lying dead under the fore-bed of the barn, having broken the door of his stable.

Post-mortem revealed a large transverse rupture of the large colon; at half its diameter near the pelvic flexure there

was no impaction, no intestinal calculi, but a marked constriction posterior to the rupture; neither was there any thickening or inflammation, but marked congestion at the constriction; anterior to the constriction the colon was totally deprived of its bosselated condition to the extent of two feet, being smooth like the stomach and much larger than the remaining portion—evidently due to drawing up at constriction. The case had been interesting to me on account of its recurrent nature, which, however, might have been due to an allowance of corn fodder, which, I have since been informed, he received the evening before his death, and also the nature of the rupture, which must have been simply due to spasmodic contraction of the colon, with subsequent distention and finally rupture on account of the total absence of any organic lesion at the constriction.

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## EXTRACTS FROM FOREIGN JOURNALS.

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### ARSENIC OUTWARDLY APPLIED.

By J. R. Cox, F.R.C.V.S.

A valuable cart horse, which had a warty growth on the side of the face, while journeying one day through the city, chanced to be espied by a certain "wise man of the east," who, boasting of the advantage of being a self-taught veterinarian, untrammelled by the incumbrance of a diploma, presented himself to the proprietor of the animal and offered his services, undertaking to make a perfect cure for a sovereign, and to remove the wart so that it should never come back again. The bargain was struck, and the *savant* commenced operations, visiting his patient regularly on three consecutive days to apply, on a stick, a "secret remedy" containing a little arsenic and some other things. At the end of three days, the wart was gone and a hole appeared in the cheek of the horse large enough to permit the passage of a man's fist, through which the wart had perhaps fallen, and the self-taught practitioner had gone to look for the wart.

The author was then called in, and, though unable to fill up the hole, succeeded in reducing it to a size sufficient to

receive a duck's egg, but could do no better, and that became its permanent condition. Food, of course, dropped through the opening, as well as the saliva, while feeding, but as most of this fell into the manger, it was not all lost. When at work a leather shield was attached to the bridle, and aside from appearances, the horse did very well for years. Four fingers could be passed through the opening, and two pairs of molar teeth were exposed. It might have been worse, however, for the parotid duct had fortunately escaped destruction — *Veterinary Record*.

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#### GOATS AND GLANDERS.

By T. CHESTERMAN, M.R.C.V.S.

Having no faith in the popular idea that goats about a stable are somehow preventive of mischief, Mr. C., on the contrary, always looked upon their presence as a danger, from the possibility of their communicating contagious diseases, and more especially glanders, to the persons employed on the premises. He reports a case of great value as bearing to the correctness of his theory: "A very fine goat, which was accustomed to run about a large stable in which occasional cases of glanders were seen among horses, one day appeared ill, and was suspected of having a cold. A few days later, going to a slaughter house to make a post mortem, the head of the goat was shown to him. Upon being opened the worst ulcerated septum was exhibited.—*Veterinary Record*."

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#### HYDROCEPHALUS—HEART DISEASE.

By K. J. URQUHART, M.R.C.V.S.

A 16-year-old cart horse, a bay gelding, had been sick for a couple of days. When seen, he carried his head as high as he could get it, did not care about turning round corners, but wanted to cut them off, so much so that his driver, in order to prevent an accident, was obliged to get out of the cart and lead the horse home. He was then in his stall with his head elevated and his nose pushed into a corner. The pulse was about 50, intermittent and irregular. The sight of the right eye was gone, and that of the left greatly impaired. Locomotion was not much interfered with, though there were oc-

casional knucklings over behind, and digging of the toes of the fore feet into the ground. A diagnosis was made of cerebral affection, caused by pressure. Heart trouble had never appeared to affect him, and was never suspected. After remaining in the same condition for a few days, he was destroyed, and the heart was found quite altered in shape, having the apex tapering in a fine point, and curved very much backwards. The right auricle contained several ossific centers, which must have interfered with its action during life. The cranium contained a quantity of clear fluid at the base of the cerebrum, and there was also a small congested spot which was observed when the brain was incised, on the near side, above the lateral ventricle. These lesions of the heart are considered by the author to have been the cause of the brain affection.—*Veterinary Record*.

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#### CLINICAL NOTE ON PAPILLOMATA.

By F. T. HARVEY.

The author had removed a large growth from a yearling nine months old. The tumor was situated on the scrotum, and had evidently grown from the line of incision made when the animal was castrated, some six months previously. On inquiry it was ascertained that the operation had been performed immediately after the removing, by the same surgeon, of an immense mass of warts from the nose of a two-year-old heifer, and it was therefore thought possible that some of the cells of the warts from the nose of the heifer had been transplanted during the castration, and finding a suitable soil, had multiplied and produced a growth of a similar nature to that of its parents. The two patients belonged to different owners, and the only possible means of contact between them must have been the hands of the surgeon, which must have been imperfectly washed, different knives having been used in operating.—*Veterinary Record*.

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#### AN UNUSUAL CASE OF LAMENESS.

By T. DUCK, A.V.D.

Under this title the author reports a case of rupture of the flexor metatarsi as follows: "*Symptoms*.—Horse in pain;

uneasy and anxious; sweating in patches. When excited to move, there was complete inability to flex and move the off hind leg, and the tendons of the gastrocnemius became relaxed, showing a deep kink about three inches above the hock. The injury had been received while jumping down from a grass field over a hedge into a road upon a lower level. Previous to this the animal had been unlucky with that leg. He had flattening over the ischial tuberosity, chronic enlargement of the hock, and thickening of the fetlock and pastern. The day after receiving the injury, the leg was found hanging loose, and in a backward position. When the limb was raised, the foot and pastern swung loosely from side to side, but when it was drawn a little in advance, relief was given and the horse rested his full weight on the limbs. Any effort of his own to advance the leg only resulted in slackening the tendons, and the appearance of the "kink" previously mentioned, with a slight throwing outwards of the toe. Beyond the chronic enlargement, there was no swelling or heat, but it was observed that when the feet were evenly placed, and the horse standing square, there was flattening of the inside of the leg, from the hock to the stifle, with a wrinkled appearance of the skin. The animal was placed in slings, and after six weeks was able to resume work.—*Veterinary Journal*.

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COMMINUTED FRACTURE OF THE LUNAR AND SIMPLE FRACTURE OF THE SCAPHOID AND CUNEIFORM BONES.

By T. MARRIOTT, M.R.C.V.S.

Fractures of those bones are very seldom noticed. The subject of this was a brown gelding, which was in harness, standing near a stable. The blanket had been removed from him, and while the assistant was proceeding to put it under the seat of the carriage, the horse started off on a trot, breaking into a canter, and then into a gallop. After going about three hundred yards, he was compelled to make a sharp turn. He got round this turn safely, but owing to the pace, the carriage did not turn so rapidly, and although he tried to avoid a dry ditch which was in his way, the conveyance pushed him into it, and turned a complete somersault over him.

When extricated the horse was found very lame in the near fore leg, and the knee much swollen and painful. Crepitation was detected subsequently. When destroyed, the following fractures were found—scaphoid, one triangular piece, chipped off the posterior surface; lunar, fractured in all directions, into five pieces; cuneiform, simple fracture from above to below, dividing the bone into equal parts.—*Veterinary Journal*.

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## EXPERIMENTAL PATHOLOGY.

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### ON THE DURATION OF THE LIFE OF PATHOGENIC MICROBES IN WATER.

By STRAUSS AND DUBARRY.

The experiments reported by them prove that, contrary to the admitted opinion, no radical distinctions can be established between pathogenic microbes and those commonly seen in water, as far as the faculty of multiplying and living in that element is concerned, a great number of pathogenic microbes enjoying this faculty, though in a less degree than the true aquatic bacterius.

The *bacillus anthracis*, as the authors have shown, are capable of producing spores in pure distilled water, and other pathogenic microbes probably possess the same property. This is no doubt the reason why, in the experiments of Strauss and Dubarry, as in those of their predecessors, bacilli able to produce spores have generally shown themselves better able to resist their sojourn in water than the micrococcus, for which no lasting forms are known.

From the point of view of the general biology of bacterias, it is important to know, in a positive manner, that many of the pathogenic microbes are able to live, for a very long time, in ordinary and even in sterilized distilled water. They are capable of accommodating themselves, within certain limitations, to this medium, and do not present as an absolute characteristic, the nutritive requirements which are sometimes attributed to them.

The chemical composition of the water containing them has no perceptible influence upon the duration of the life of pathogenic microbes, and their term of life is the same whether living in strictly pure distilled water, or in water more or less loaded with organic matters.

Their conclusions are that water otherwise quite chemically pure, which have become contaminated by the presence of pathogenic microbes, do not offer any better guarantee of innocuousness than waters more loaded with organic and inorganic elements; a point of the highest importance in its relation to the subject of general hygiene. And again, respecting most of the pathogenic microbes, their existence in water does not produce any noticeable change in their virulency, with perhaps one exception, the single exception of the bacillus of tuberculosis.—*Archiv. de Med. Exp.*

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ACTION OF RABID VIRUS INTRODUCED EITHER IN THE  
SUBCUTANEOUS, CELLULAR OR IN OTHER TISSUES.

By C. HELMAN.

The author concludes, from the absence of rabid virus in the blood, lymphatic glands, etc., that this virus cannot be cultivated except in the nervous substance, and that it gives rise to infection only when it is introduced by inoculation directly into the nervous cells, or when it is not prevented from entering by the other tissues. Introduced and localized in the sub-cutaneous tissue, it does not give rise to infection; remaining in the cellular tissue, it may give immunity. The degree of immunity is in direct ratio to the quantity of fresh virus introduced. From experiments made on dogs, rabbits and monkeys, by Helman, he concludes that infection depends not on the part of the body where the injection is made, but on the kind of tissue reached by the virus. Strong doses of virulent matter, which, if introduced into the cellular tissue would give rise to immunity, will very often produce rabies if injected into the muscular substance. Preventive inoculations of effective virus are a great deal less dangerous to man than to animals, because there is no cutaneous muscle in man where the inoculation is made. Those inoculations

often succeed in dogs, because of the thin layer of sub-cutaneous cellular tissue they possess, while they fail in rabbits, whose cellular tissue is thin, and the skin strongly adherent to the cutaneous muscle.—*Revue des Sc. Medic.*

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### STUDY UPON IMMUNITY IN RELATION TO ANTHRAX.

By PROF. PERRONCITO.

A vaccinated ram was inoculated with anthrax matter, by Perroncito, seven times, with varying intervals between the injections. The first merely gave rise to a little fever, and four days after the last injection, the animal was killed. At the point of inoculation a sero-gelatinous infiltration was found, and a little below it, a purulent nodule. The pus, however, though it contained at the same time streptococcus pyogenis and sporiferous threads, having all the appearance of those of bacillus anthracis, with granules in all respects resembling spores, did not produce the bacillus anthracis when placed in culture. The cultures made with various tissues, and their inoculations to guinea pigs remained negative. From this experiment the author comes to the conclusion that there is a rapid destruction in the tissues of vaccinated animals, of the forms of virus, even the most resisting, such as the spores.—*Annales de Pasteur.*

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### BIBLIOGRAPHY.

NOUVEAU DICTIONNAIRE PRATIQUE DE MEDECINE, CHIRURGIE AND HYGIENE VETERINAIRES, begun by H. Bouley and continued by A. Sanson, L. Trasbot, Ed. Nocard.—Vol. XVI. and XVII. (Asselin and Houzeau.—Paris).\*

Two new volumes are here added to the excellent encyclopedia of veterinary science which, beginning more than thirty years ago, will doubtless witness the lapse of several more years before the completed work winds up with the inevitable "finis." These volumes are equal, in the importance of the topics they discuss and the ability with which they are

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\*New Dictionary of Practice of Veterinary Medicine, Surgery and Hygiene.

treated, to the best of their predecessors, and like those which they immediately follow, will not fail to post the attentive reader in all that is new and progressive in veterinary experience and discovery, including all the achievements which have marked the progress of veterinary medicine in the last few years in Europe.

Amongst the more prominent and important of the numerous subjects treated in Volume XVI, we may make special mention of Pathology, by M. Trasbot; Diseases of the Skin, by Mr. Cadeac; of the Penis, by Mr. Cadiot; of the Pericardium, by Mr. Trasbot; Contagious Pleuro-Pneumonia, by Mr. Peuch, and Diseases of the Peritoneum, by Mr. Labat. In Volume XVII, which forms a book of six hundred pages, are some very interesting articles from the pens of the ordinary collaborateurs of this excellent work, and to mention only a few of these we may cite: Rinderpest, by Mr. Peuch; Pathology of the Foot and Wounds, two articles, by Mr. Cadiot; Diseases of the Pleura, by Mr. Trasbot, and of the Guttural Pouches, and on Veterinary Sanitary Police, both by Mr. Peuch. Besides these, there are many others on topics and of a quality which render the work such a magazine and arsenal of material as no aspiring veterinarian can dispense with, who aims to be suitably\* equipped for the important duties he has assumed.

The addition of three new volumes to the work in a single year seems to augur an early completion of the dictionary, which, when finished, will form the most complete and probably the ablest work of its kind in our literature.

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“ANIMAL PHYSIOLOGY,” by Wesley Mills, M.A., M.D., L.R.C.P., (Engl.), Professor of Physiology in McGill University, and the Veterinary College of Montreal. (D. Appleton & Co., N. Y. City).

Although the publication of this work of the able professor of the Montreal Veterinary College follows closely that of a kindred treatise, the “Physiology of the Domestic Animals,” by Dr. R. M. Smith, they vary somewhat in their scope and treatment, inasmuch as the work of Dr. Mills does

not profess to aim at any special adaptation to the requirements of veterinary practice, and occupies a somewhat broader plane in topic and treatment.

In this new work Dr. Mills may fairly claim to have substantially enriched our English medical literature, and his book will doubtless receive a hearty welcome from all who are interested in physiological investigations. In the present work the author has departed from the somewhat old routine of his predecessors, by prefacing his essay with a consideration of the important subject of biology, with the history of the cell-structure, of vegetable and animal growth, and a dissertation upon the origin of the forms of life and the development of the embryo. Passing thence, he enters upon a review of the philosophy of various progressive developments, and little by little, and degree following degree, the reader is systematically conducted to the consideration of the entire functions of circulation, the blood, the digestion and the respiration, and through the entire connected phenomena the vital processes. The matter of the work is wisely collated, and the task of elucidation and arrangement skillfully performed, and the result is an eminently satisfactory rendering of difficult and delicate material into a simple and attractive literary form. One of the principal difficulties encountered by the author must have been to combine and exhibit his materials in such a manner as to preserve a due interest in secondary and subsidiary subjects, important and essential, though still of a minor character, without departing from his main purpose, or detracting from the proportionate prominence of the leading theme, as expressed in the title of *Animal Physiology*, and his performance in this respect has been as wholly successful as it is eminently skillful. To read the book carefully ensures the comparatively easy acquisition of knowledge, and no doubt, the principal aim of the author, which is, in his own language, to "make the book, from first to last, educative," will be satisfactorily realized by students of both human and veterinary comparative medicine.

The illustrations are well executed, and the liberal number of original drawings are evidence of the time and labor

which must have been devoted to the preliminary and experimental work which Dr. Mills must have performed in the preparation of the material employed.—A. L.

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## CORRESPONDENCE.

### UNITED STATES VETERINARY MEDICAL ASSOCIATION.

#### *Editor of Review:*

The list of officers and committees of the United States Veterinary Medical Association for 1889 and '90 are herein enclosed.

A cursory examination of the same will suggest the fact that in the subjects enumerated, the names of members of committees, the long list of Assistant State Secretaries and their geographical distribution, we are fully equipped for a wide range of work and ready for the ensuing year to fully represent the profession in this country, in the grave and weighty responsibilities of the veterinary world.

I have personally notified each member of his appointment, but lest it might be miscarried, I take the opportunity of again calling their attention to their duties. Let the work for the annual meeting of 1890 be now planned and led on to a complete state, for sufficient time is now assured for a thorough hearing and discussion of every topic that is of interest to the profession.

We have not done in the past all that there was for us to do, nor even completed that which we planned. The long list of members, now numbering over two hundred and fifty, should be a sufficient guarantee to other countries that we are able, ready and willing to co-operate with them in all movements of a national character, to advance the veterinary profession and through them the whole civilized world.

The interests of our own country are very great, and there is work for every member to do. The one subject of tuberculosis alone offers to every individual enumerated in our list a field of usefulness, and they one and all are looked to for aid in strengthening the hands of the committees. Members should not wait for appeals from the committees,

but should forward them at stated intervals all data that shall make complete the work of our Association.

W. HORACE HOSKINS, *Secretary*.

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## POSITION WANTED.

MISSOURI HORSE EXCHANGE,  
BROADWAY AND CHOUTEAU AVE.,  
ST. LOUIS, MO., Nov. 12, 1889. }

DEAR SIR.—Will you kindly insert this in your VETERINARY REVIEW of next month.

Wanted, by a member of the Royal College of Veterinary Surgeons, England, a situation as an assistant or manager. Ten years experience and the highest class testimonials.

BENJAMIN COOK, M.R.C.V.S.

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## REVISED CONSTITUTION OF THE U. S. VETERINARY MEDICAL ASSOCIATION.

*Editor of Review :*

I desire to announce through your columns to the veterinary profession that the United States Veterinary Medical Association has now issued a revised copy of their Constitution and By-Laws, which distinctly state the objects and aims of the Association, with the laws governing its members, a copy of which will be forwarded to any member of the profession on application to the Secretary.

W. HORACE HOSKINS, *Secretary*,  
12 S. 37th St., Philadelphia, Pa.

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### ARMY VETERINARIAN FUND.

FORT WALLA WALLA, Nov. 10, 1889.

*Committee on Army Legislation, U. S. V. M. A.*

GENTLEMEN.—Inclosed find twenty dollars to assist in defraying expenses in the passage of our proposed veterinary bill through Congress. Surely this bill will not fall through for lack of funds. I would gladly subscribe ten times the amount if money was all that was required. Make one grand effort, gentlemen ; you have my earnest support.

Yours respectfully,

JOHN ROBERTSON.

Veterinarian, Second U. S. Cav.

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## SOCIETY MEETINGS.

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The New Jersey State Veterinary Society held a *special meeting* at Saenger Hall, Newark, N. J., on Tuesday October 29th, 1889.

The President, Dr. E. L. Lobelein, called the meeting to order at seven o'clock P.M.

The roll call was answered by Dr. J. C. Corlies, Dr. I. N. Krowl, Dr. C. Kuehne, Dr. E. L. Lobelein, Dr. Wm. H. Lowe, Dr. M. G. Mattison, Dr. E. R. Mercer, Dr. J. Nayler, Dr. L. R. Sattler, Dr. A. Sherk, Dr. A. G. Vogt, Dr. E. R. Voorhees, Dr. W. H. Mook, Dr. A. H. McIntosh, and Dr. J. Hopkins. Mr. E. D. Bachman and Mr. C. L. Trudichum, students of veterinary medicine at the American Veterinary College, were also present.

The Secretary's report was adopted as read.

The Secretary read the call for the meeting as follows—

*Dr. E. L. Lobelein :*

SIR: We the undersigned members of the New Jersey State Veterinary Society, respectfully request that you call a special meeting of the society at an

early date for the transaction of business under the new law entitled "An Act to protect the title of Veterinary Surgeon and to regulate the practice of Veterinary Medicine and Surgery in New Jersey," and such other business as may come before the meeting.

(Signed by)

WM. H. LOWE, D.V.S.

J. F. AUTENREITH, D.V.S.

JAMES McCaffrey, D.V.S.

E. R. VOORHEES, D.V.S.

L. R. SATTLER, D.V.S.

The first business in order was the election of Counsel to the Society, and Dr. Wm. H. Lowe presented the name of Hon. R. Wayne Parker of Newark. He was accepted by a unanimous vote.

Dr. Corlies moved that the committee which had been appointed at the last meeting be increased to five, instead of three as at present; it was seconded and was carried when put to a vote. The President appointed Drs. Voorhees and Hopkins to act with Drs. Lowe, Sattler and Corlies, who had been appointed at the last meeting, this committee to be known as the "Committee on Jurisprudence," that they confer with our counsellor, and are appointed with power. The committee drew up the following resolutions, which were unanimously adopted:

*Whereas*, The Legislature of the State of New Jersey passed an act entitled "An Act to protect the title of Veterinary Surgeon and to regulate the practice of Veterinary Medicine and Surgery in New Jersey," Chapter xxiv, Laws of New Jersey, 1889, approved March 4, 1889; and

*Whereas*, Said law requires all practitioners of veterinary medicine and surgery who are graduates of a legally chartered veterinary college to register in a book kept for that purpose in the office of the County Clerk in the county in which they reside; and it is made the duty of County Clerks to keep a record of each diploma, together with affidavit of veterinarian that he is the person to whom the diploma was issued, etc.; and

*Whereas*, Said law also requires all persons who have assumed the title of veterinary surgeon or analagous title, in this State for the five years preceding the passage of this law, without being entitled to the degree of veterinary surgeon, shall be allowed to continue the use of the title; but such persons shall appear before the County Clerk of the county in which they reside within six months after the passage of this act (March 4, 1889,) and make affidavit to that fact; and the County Clerk is then required to register such person as an "existing practitioner." Now, therefore, be it

*Resolved*, That realizing the importance and monetary value of our stock industry, and appreciating the grave danger of communicable diseases from domestic animals to man through our food supply, and the intimate relations existing between man and animals (horses, dogs, etc.), we gladly commend the wisdom of our legislators in the enactment of a law designed to afford protection to owners of domestic animals against the impositions practiced by charlatans and empirics who have *assumed* the name and functions of an honorable professson.

*Resolved*, That we respectfully demand of those in authority that Chapter xxiv., Laws of 1889, shall be strictly enforced, and especially call upon the Prosecuting Attorneys of the different counties to give particular attention to the prosecution of offenders; and in order that every effort shall be made to enforce the law, we hereby authorize our counsel, Hon. R. Wayne Parker, of Newark, to take such measures as in his judgment are necessary to enforce the law.

*Resolved*, That all veterinarians of New Jersey, graduates of legally chartered veterinary colleges, be requested to send their names to our Secretary, Dr. Charles Kuehne, Jersey City, N. J., and be enrolled as members of this Association, and also to forward full information as to infringements of this law (chapter xxiv.) in their respective counties, in order that they may receive the attention of our attorney.

After transacting other routine business, the meeting was adjourned.

CHAS. KUEHNE, D.V.S., *Secretary*.

## RESOLUTIONS

## ON THE DEATH OF DRS. THAYER AND MOULTON.

The committee appointed at the annual meeting of the United States Veterinary Medical Association held at Brooklyn, New York, September 17, 1889, issue the following preamble and resolutions upon the death of E. T. Thayer, M.D. V.S., of West Newton, Mass.

*Whereas*, In the death of E. T. Thayer, M.D., V.S., of West Newton, Mass., the veterinary profession of the United States have to mourn the loss of an associate, and one of the founders of their Association.

*Resolved*, That by his death we lose the co-operation of one whom we have learned, through long association with, to regard as a large hearted, liberal minded and conscientious man.

*Resolved*, That as citizens we feel that the community has lost one whose sterling integrity, faithful discharge of duty and professional ability had rendered his life an ornament to his profession.

*Resolved*, That we tender to his bereaved family our sincere sympathy in their affliction.

*Resolved*, That a copy of these resolutions be forwarded to the family of our deceased associate, and the same be printed in the AMERICAN VETERINARY REVIEW and *Journal of Comparative Medicine and Surgery*.

By order of Committee,

JOSIAH H. STICKNEY,  
J. F. WINCHESTER,  
L. H. HOWARD.

*Whereas*, We have learned with regret of the death of Charles L. Moulton, D.V.S., an honored member of the United States Veterinary Medical Association,

*Resolved*, That we express our grief at the early decease of a respected member.

*Resolved*, That by his death the veterinary profession lose an associate, valued alike for his sterling integrity, faithfulness to the cause of the profession and good fellowship.

*Resolved*, That a copy of these resolutions be spread upon the records of the Association, and be published in the AMERICAN VETERINARY REVIEW and the *Journal of Comparative Medicine and Surgery*.

JOSIAH H. STICKNEY, }  
J. F. WINCHESTER, } *Committee.*  
L. H. HOWARD. }

# AMERICAN VETERINARY REVIEW,

JANUARY, 1890.

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## EDITORIAL.

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ARMY VETERINARIANS—ARMY LEGISLATION.—Confidence in the success of the present effort—Congress will most certainly grant our request—the profession awake—subscriptions increasing—objections from some—danger of too many bills—separate efforts, laudable as they may be, should be stopped—let the motto “all for one” be ours—let the United States Veterinary Medical Association go ahead—the Chairman of the Committee, Dr. Huidekoper, will leave no stone unturned to succeed. HEALTH VETERINARY OFFICERS.—The next question of importance—State and City Boards of Health can no longer ignore veterinarians—few now are appointed, but more are bound to follow. VETERINARIANS AS JUDGES AND INSPECTORS.—The request for their appointment made by one of our best agricultural papers—it wants veterinarians appointed to horse shows as judges and inspectors—all those official appointments will have their drawbacks—official decapitation—Dr. J. F. Winchester one of the last victims—Massachusetts moves backward—these appointments will have to be made life positions. PROFESSOR HUIDEKOPER AND THE VETERINARY DEPARTMENT OF THE UNIVERSITY OF PENNSYLVANIA.—His resignation—he retires to private practice and assumes the editorship of the *Journal of Comparative Medicine and Veterinary Archives*.

ARMY VETERINARIANS—ARMY LEGISLATION.—Reverting to our remarks touching the status of veterinarians in the army, in previous numbers of the REVIEW, and reflecting further upon the conclusions we had formed, we have become more than ever confident that the result which we have hoped for and anticipated is nearly sure of ultimate realization. We feel in a good degree assured that the session of Congress now in progress will not close until a better recognition of the claim of our army brethren has been secured and established. The entire profession may be said to have become at length interested in the subject, and every one

seems to be willing and ready to contribute his mite towards the final success of our endeavor. The subscription to the army veterinary fund, which we initiated a month ago, has been somewhat increased, and we are confident that the amount of funds now on deposit will soon be augmented by new contributions.

We have carefully examined the letter which we print in the present number from an Army Veterinarian. Of course there will be some disappointment attending the prosecution of this matter; it is not likely that everybody will be satisfied. It is not a part of the constitution of human nature to "accept the situation" without question, in any case. But if we eventually secure the enactment of the measures which we understand high military authorities are favoring, and are willing to grant, it will be a long step forward, and little as it may seem to be, will establish a ground of hope for the attainment of something better at some future day. There is room for fear, however, that with a commendable anxiety to help the cause, and with the best of intentions, errors may be committed which, if not doing positive harm, may obstruct the progress already assured. At least we so judge, if we are to believe the news which has reached us from headquarters. We allude particularly to the recent act of one of our veterinary societies in circulating the draft of a new bill "to provide for the organization \* \* \* \* \* etc." This may be all very well, and may mean good, but have there not been bills enough drafted, circulated and perhaps lobbied already, all in good faith and springing from an impulse of disinterested zeal? It was for the help of a good cause; it was the motto of "all for one." May we not urge that so long as the United States Veterinary Medical Association has the entire charge of the matter, and while the existing committee has for its chairman the man who, we must all concede, is better able than any other to secure a successful issue for his plans, that no new bill, or different policy or project, which may interfere with the work of the National Association ought to be permitted to confuse the issues and hazard the success of the whole measure? The true policy

to adopt is that of harmonious co-operation and concert of effort with Dr. Huidekoper and his colleagues on the committee. The letter of Dr. Griffin is in the right spirit, and furnishes a good example for others to follow.

HEALTH VETERINARY OFFICERS.—The question of the army service is, perhaps, the most important of any which veterinarians are now called upon to consider, but as soon as a satisfactory adjustment of this is accomplished, others will present themselves for study and settlement. One of these is the position to which veterinary surgeons in civil life are entitled, and it is one which cannot be practically ignored or overlooked much longer. We refer especially to the status of veterinarians as members of State and City Boards of Health, and to the fact that in some cities regular graduates are holding positions as veterinarians, (under the civil service law, we believe,)—Dr. S. K. Johnson, in New York City, and Dr. L. F. Bell in Brooklyn, for example. If there are others, we are not aware of the fact, and would like to be informed on the subject. But it is not sufficient to point to individuals here and there, or to isolated cases, where they may be needed.

In every State or city where a Board of Health exists, they should appear in a conspicuous and influential position, and if this were so, the amount of professional services which veterinarians thus appointed would render would soon demonstrate to the public the wisdom of utilizing their scientific acquirements, and prove the value of their economic labors. The result would give prominence to some of the most important applications of veterinary science, and could not but convince the popular mind of the value of the veterinarian to the community as a sanitarian and an hygienist.

VETERINARY JUDGES AND INSPECTORS.—The minds of the people are indeed becoming gradually prepared as it is, for a new recognition of veterinarian usefulness.

We were strongly impressed by this fact by reading an article recently published in the *Breeders' Gazette*, under the title of "Veterinary Inspection Demanded at Horse Shows." This is a valuable and significant, if somewhat tardy tribute

to the veterinary scientist. It indicates the great fact that the intelligence of the community has at last become instructed and convinced, and is already demanding from our professors and practitioners the services which they have so well prepared themselves to render, until it has come to be a settled thing that veterinary science *is* a science. And now it has come to pass that in looking for competent judges at horse shows; for inspectors of abattoirs and meat markets and stock yards; for examiners of milch cow stables—any function, in short, connected most intimately with the public health as affected by the consumption of animal food, the veterinarian is the accepted protector of the health of the people, and guardian of so much of the wealth of the nation as exists in quadruped form. Where, now, is the “horse doctor” upon whom the “light of other days” was wont to shine?

Another aspect of this subject may be profitably considered. These qualifications for professional duty mean so many official positions, and what is official with us means politics and office holding. That of course means, also, exposure to the political guillotine. How often, indeed, has some veterinary head been recently dropped into the basket! Dr. J. F. Winchester has recently been victimized in this way, and after a connection with the cattle commission of Massachusetts for a single term has suffered decapitation, to be succeeded by a good old gentleman, an excellent and honest man perhaps, but who is *not* a veterinarian. (To see Massachusetts traveling backwards is a queer spectacle). So long as politics is permitted to play such a part in connection with a *professional* position, it is a question with us whether such employments are worth looking after. Perhaps in the days to come a strictly enforced civil service law may convert these appointments into the life situations which they ought to be, terminable only for disability or misconduct. Finally, the wonderful progress this profession of ours has been making of late may justly excite and excuse the enthusiasm of those who have identified themselves with its history and achievements, by becoming co-laborers with Pasteur and

the other illustrious names which have glorified modern science.

PROF. HUIDEKOPER AND THE VETERINARY DEPARTMENT OF THE UNIVERSITY OF PENNSYLVANIA.—It is with regret that we have once again to refer to the resignation of Professor Huidekoper, of the Veterinary Department of the University of Pennsylvania. Since the inception of the idea of founding this school, Professor Huidekoper has been most active in securing what no other schools have ever obtained, viz.: State, city and private assistance. We do not think that we can be charged with error or exaggeration in crediting him with being the principal founder of this institution. The Professor has now retired to private practice, but intends to devote a portion of his time to the editorial work of the *Journal of Comparative Medicine and Veterinary Archives*, a monthly journal about to be issued. Meanwhile, he will not lose sight of the army bill, but will labor for its success with his usual ardor and enthusiasm.

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## ORIGINAL ARTICLES.

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### GLYCERINE IN VETERINARY PRACTICE.

By DR. J. COATES, M.D., D.V.S.

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I desire to say a few words concerning a class of cases about which a great deal has been written and yet more light is welcome. I refer to flatulent colic. The first months of practice brought many cases of this kind under my observation, and I am free to admit, failure in treatment was more often the rule than the exception. After reading all the literature obtainable on the subject, I decided upon investigating the claims of puncturing the intestines, which was used as a *dernier ressort*.

Having had good success in the first few cases, I adopted it as the only remedy in these cases with a small percentage of deaths, and in the first twelve years operated upon over one thousand cases, with death rate at a minimum.

After reading a paper on the subject before the New York State Veterinary Society, from which time the trocar and canula became greatly used in the city in such cases, and also taught the students of the American Veterinary College its unlimited use, that now it is practiced all over the country with the greatest success.

The one unremitting search of the day is for a key to the true nature of disease, and for remedies which do no violence to natural laws. A large number of popular remedies suffer from the effects of being too generally recommended. According to the claims of their originators, they are useful in the most bewildering variety of ailments, curing every disease. Where too much is claimed, we are apt to grant too little; and where we have been disappointed by using a drug in cases not suited to it, we are likely to doubt altogether its possession of any therapeutic value.

Within the past few years, the use of glycerine in constipation as a remedial agency has been receiving much attention by practitioners of both human and Veterinary medicine. Most of the modern authorities report very enthusiastically in its favor, but none of them have as yet written anything in regard to its use in flatulency, for it is certainly to be regarded as one of the greatest agents.

It is wonderful that in this substance we have, if we use it properly, one of the most potent weapons in the warfare upon flatulent colic.

Having access to a large number of both medical and veterinary journals and pamphlets, my attention was called to an article on the use of rectal injections of pure glycerine in constipation, and was somewhat dazed that such a prompt action took place. Being always ready to try any new remedy, I have used it on over one hundred dogs for constipation with a prompt action in every case in from one to three minutes rarely over two minutes after enema was given. As a firm believer in its use then I tried its effects upon a number of horses, with an action in three or four minutes, much more readily when the rectum is full of feces. Then used it on three cases of constipation in horses with poor success, as

from my observation the rectum must be partially filled with feces or no action takes place, except the prompt evacuation of the glycerine and a considerable amount of flatus. Acting upon the thought suggested by the fact of the violent expulsion of flatus during its use in these cases, I began using enema, of pure glycerine in cases of flatulent colic as an experiment; the results of this method are the best I have ever obtained in the treatment of flatulency, and the most likely to be efficiently carried out.

The only real difficulty in treating cases by puncturing is the objections of the owners, afraid some serious result will take place, seeing a trocar introduced into the abdominal cavity, but, however admirable this method may be in the treatment of flatulency, if another method can be shown to be as effective, more safe and more simple, the former should give way to the latter. During the past four months I have used it in ten consecutive cases of flatulent colic where the abdominal walls were greatly distended, with the most gratifying results and a complete recovery of each case, and as sufficient time has now elapsed since the treatment of these cases, I report its use for the benefit of the profession, as other members may take it up, for throughout the medical world analysis and research are active and eager for new light. Routine methods and antiquated theories which have only popular prestige and venerable antiquity to sustain them, are no longer competent to satisfy thinking minds.

In the cases above mentioned I have found that one ounce of pure glycerine injected in the rectum has caused a prompt and free flow of flatus from the intestinal tract, which is usually kept up for two or three minutes, with a subsidence of the distended abdominal walls. Should there not be a complete collapse of the walls, the same amount of glycerine should be repeated one, two or three times, with intervals of ten or fifteen minutes.

I am not prepared to say how glycerine acts in these cases; probably by reflex action, causing an increased peristaltic action of the large intestines.

Dr. Anacker's experiments on various animals have proven

that from half a dram to half an ounce is sufficient to cause movements of the bowels. Prof. Vogel reports that pure glycerine, or when diluted with one-third of water, when injected into the rectum, causes more or less muscular irritation of the rectum, and produces a remarkably prompt movement. In a few minutes after the injection of glycerine, we can notice, through the action upon the mucous membrane of the rectum, the animal becoming a little uneasy; the anus contracts and dilates spasmodically; the tail raised at times, then arching of the back followed by defecation. Two or three movements are the average caused, frequently more, and it is claimed, from the condition shown, that they come from the large intestines, and the action is not continued longer than ten minutes. It has been shown that the action of glycerine in constipation is due to its hygroscopic power, drawing the moisture from the tissues of the rectum, slightly irritating the nerves and causing a contraction of the rectum.

The experiments have shown that it does not make much difference about the quantity injected, but the quality. Pure, undiluted, neutral glycerine, specific gravity of 1.225 to 1.235, is the best to use.

Dr. Schindelka has used glycerine on over two hundred and fifty patients; (horses, goats, dogs and cats) with positive results in every case. He claims that in young or old, sick or well horses, about eighty drops are sufficient to cause defecation. For cats twenty drops were used and for goats thirty drops.

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## VETERINARY EDUCATION IN AMERICA.

BY TAIT BUTLER, V.S., Davenport, Iowa.

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One of the regular committees of the United States Veterinary Medical Association is that on Intelligence and Education, and by referring to Chap. V., Sec. II., of the by-laws I learn that the duties of that committee are 'to collect and report to this Association recent veterinary medical facts and intelligence.' This definition of its duties, together with its reports, certainly indicate that it is a committee on intelligence only, and as

such I have no fault to find with it ; but if it neither considers nor is expected to consider, the question of veterinary education, why in the name of common sense is it called a committee on *education*? If the duties of this committee *do* include the consideration of the important question of veterinary education, is it not about time something was done to arouse it to a proper appreciation of its responsibility. Or, if on the other hand, its duties *do not* include the consideration of this question is it not about time the Association awoke from its Rip Van Winkle sleep and created a committee that may be known for something more than official incapacity? I do not desire to occupy too much of your space with "caustic criticism," but feeling that more active work should be done towards elevating the standard of veterinary education in America, I ask permission to call the attention of the profession to a few of the improvements most needed.

The first evil I desire to notice is that of matriculating men possessing not even the rudiments of a general education. I have letters in my possession, received from veterinarians, that as examples of profound ignorance of the most common rules of orthography and syntax seem almost incredible. For instance, a graduate of a college that claims to exact evidence of a "good English education" from applicants for membership, persists in spelling mare, *mair*. One from another college, who also writes M.D. after his name, is quite sure that *uterus* should be written *utrus*. And one from another college, who also holds the commission of one of the State Governors, as Assistant State Veterinarian, seems to think *quarintene* the proper way to spell *quarantine*, and that *contagos* is an improvement on *contagious*. Still another who holds the diploma of a "legally organized" veterinary college, is actually guilty of perpetrating the following, "My bisness is bigger this year than it were last." Does not this sentence suggest rather a sad reflection on the public intelligence? Does it not reflect disgrace upon every veterinarian in America? To what purpose is all this fine talk about elevating the veterinary profession to its proper social standing, when such hopeless illiteracy is to be found in its ranks? Especially, since I assure you,

the cases I have cited are by no means exceptional, but if I desired to unnecessarily disgrace your pages I might give many more similar examples from letters received from graduates of nearly every veterinary college in America. I am convinced that, in nearly every college on this continent, the so-called entrance examination is a fraud and a humbug, and that before the *personnel* of the profession can be improved the *personnel* of the colleges must be looked after. For, while it is an unpleasant fact to admit, it is nevertheless true, that the "management" of our veterinary colleges are unduly loyal to self-interest and altogether too careless of the welfare of the profession. The second evil to which I wish to call attention is that of employing men to teach veterinary students who are not themselves veterinarians. I am certain there is not a veterinary college in North America, in the faculty of which are not to be found two or more professors with no other qualification than the degree of M.D. Are veterinarians to be found in the faculties of colleges of human medicine? Is their absence from such faculties because they know less of human medicine than the average M.D. knows of veterinary medicine? If such were the true explanation of their absence I should certainly blush for shame. The fact is, however, that members of neither of the two medical professions are competent to give proper instruction in other than their respective branches. In other words, none but thoroughly practical veterinarians know the needs of veterinary practitioners; hence it is obvious that there are too many M.D's in the faculties of our veterinary colleges whose place should be filled by equally well educated and much more competent veterinarians.

The third point we shall notice is, in my opinion, the most important yet considered. It is that of filling (?) two or three chairs by one man. Fancy the absurdity of one man presuming to do justice to the chairs of veterinary *Medicine* and *Surgery*; or attempting to properly fill the chairs of *Anatomy* and *Surgery*, besides doing a general practice and as much other work as usually occupies the attention of two or three men. I most assuredly entertain nothing but the most profound

respect for his energy and self-assurance, but, as one interested in the future welfare of the profession, I sincerely deplore the condition of affairs which renders such a thing possible. No man is too large for the chair of Surgery, I care not how varied and extensive his experience, nor how comprehensive and profound his knowledge; yet there is not a college in America where that subject receives the undivided attention of a veterinarian. If we look to the practical side of this question we find that probably from one-fourth to two-thirds of the professional income of the average veterinarian is derived from surgery alone, and yet, how few recent veterinary graduates know the first principles of the science of surgery, either in theory or practice? I am certain that upon leaving the Ontario Veterinary College my knowledge of surgery was disgracefully meagre and by contact with men from other colleges I am forced to conclude that such is usually the case. But what else can be reasonably expected so long as the professors of surgery in all our colleges have such a multiplicity of other duties.

There is another matter worthy of careful consideration and concerted action. Three terms of six months each is undoubtedly the proper length of a college course, but if such cannot be secured at present, might not a determined effort secure a course consisting of, at least, two terms of nine months each? Eighteen and not eleven months should certainly be the minimum for actual college work.

Much has also been said concerning a uniform standard of examinations for all the colleges, but, in my opinion, such is neither practicable nor desirable. A consummation much more to be desired is the establishment of a nearly uniform standard of instruction.

If sufficient interest were evinced by the "rank and file" of the profession, might not the colleges themselves take the initiative in bringing about the desired results? But if they will not be convinced of their duties, why would not the United States Veterinary Medical Association be aroused to action. True, the past record of that organization seems to scarcely justify the idea, but is not even this

'semi-fossilized' body beginning to show signs of life and usefulness? However, if the desired results can not be obtained through either of the channels suggested, is there not a third course of procedure open to us? Is there not a remedy for these evils within the reach of the alumni of the individual colleges? Might not the alumni of any of the colleges by a determined and concerted effort compel their respective colleges to accept the desired curriculum?

I am aware that in the foregoing I have but followed the old example of "talking much and doing little," but if it appears desirable, I may, on some future occasion, map out what I consider to be the proper course of procedure in the premises.

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## REPORT OF COMMITTEE ON INTELLIGENCE AND EDUCATION.

BY PROF. W. J. COATES, M.D., D.V.S., Chairman.

(A Paper read before the United States Veterinary Medical Association.)

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*Mr. President and Gentlemen:*

As chairman of your Committee on Intelligence and Education, I reported at the last semi-annual meeting that this Association should centralize where the best thought and the best work of the veterinary profession can be done; that it should be the centre of veterinary activities, encouraging, assisting and stimulating good work, for the restless explorer is not necessarily the intelligent discoverer, and the critic is rarely the constructor.

There are a number of State societies doing good work, and delegates from these would certainly make our meetings both interesting and instructive, for it seems an impossibility to get together the members of this Association; the meetings are hardly begun when they are ended, and that twice a year. Why not have a representative from each and every State society at least, lasting a longer period, and have a chance to give rise to expression and freedom of thought in the discussions.

To be intelligent nowadays demands a general acquaintance with many branches. It is said a little knowledge is

dangerous. If a little knowledge is dangerous, where is the one who has so much as to be out of danger. We are all eager to keep abreast with the times, but it needs a life time to become profoundly learned in any branch, and if these meetings are cut short without free discussion, the Association will be known by name and not by action.

This Association, carried on in a proper manner, will become a great power in veterinary science. The different State and other societies pertaining to veterinary medicine and surgery have their regular meetings monthly or otherwise to relate cases and discuss papers of every day practice, while the business of this Association should be relative to matter of more special interest and the discussions by cultured men. The higher and wider the culture of the intellect, the greater will be the influence.

The most precious treasure which any nation has is its young men of talent and genius, and men of genius do not exist in abundance. It is generally among men with limited means that the greatest treasure of vigor, self-reliance, talent and genius are found, and also a fact that the larger number of every profession are not men of superior ability, but men of ordinary capacity. The only accountable reason I can give for the existence of this fact in the veterinary profession is that many commence the study of veterinary medicine with insufficient preparation or previous education, and, if they find the examination too hard at one school, they present themselves at another where the examination is easier. Should they be denied by all reputable schools, they can obtain a certificate from a society in a beautiful form, giving them power to practice, saving time, trouble and money; or in some sections of the country they can start in practice without any preparation whatever, (except cheek and brass, in which they are not lacking) as there is no law prohibiting the practice of veterinary medicine or surgery in the States, with the exception of New York and Pennsylvania.

New York State, through a selected number of her veterinarians, used their influence to secure the passage of an Act protecting and regulating the practice of veterinary medicine

and surgery in their State, which was a just cause and passed on its merits. The bill was not perfect by any means, for it was cut and pruned to meet the objections of the Legislature, the majority of the veterinarians claiming it was worse than no protection, but it was something, and has been made more stringent by amendments. It will be perfect in due time, for the population, wealth and enterprise of New York are admitted to be second to none.

This year Pennsylvania has followed the example of New York, and I believe New Jersey and other States are doing the same, which is encouraged by the medical profession, as some of their journals have published well written editorial articles on the advancement of veterinary science and the relation of veterinary to human medicine.

It is claimed by some that the men of a profession build up their own profession and not by others. If such were a fact where would any profession be to-day? The veterinary profession is vastly modified by other professions, by chemists, by practitioners of human medicine and men of science generally, and vice versa. Chemists as Pasteur and Koch have changed the idea as to the origin of disease. The veterinary vastly helps the medical profession, by their study of the diseases which are communicable from animal to man. The progress of medicine would be slow were it not for men of science in their special departments. Take, for instance, Bouley, who was a veterinarian and who by his vast knowledge and scientific experiments was given the highest office in the Academy of Science in France—its Presidency.

How often do some of the practitioners of human medicine scorn the veterinarian, because he treats the animal creation, lower than man. Do they give it a thought that a veterinarian not only studies a cure of diseases of animals for the animals' benefit alone, but the human family as well, by protecting the live stock interest as food stuff, as well as contagious diseases which are transmitted from animal to man.

The most difficult part of the study of medicine is the etiology of diseases, and by the recent investigations of Pasteur of Paris and of Koch of Berlin, the theory and practice of medicine will turn.

I might say much in regard to the manner in which students are taught in the veterinary colleges of the United States and Canada, but, at present, probably the less said the better.

The faculties of the various colleges have their own method of imparting knowledge to their students. Some lecturers, instead of creating an interest in their subject, often drive the student from it, and they grow weary of what they do not comprehend, and confuses them; others teach by observation and make the student interested by demonstrations and bringing the specimens before the class to exhibit the appearances. The practical work with surgical instruments, chemical and microscopical apparatus is a marked feature in the training of students.

The object of our colleges is to prepare men for the practice of veterinary medicine and surgery, to give them that range of knowledge necessary for their profession. An educated veterinarian must have some knowledge of the laws of chemistry; he may not be a chemist in the popular sense of the term, but he should have some idea of the chemical constituents of the animal fluids and solids of the body; the organs and parts in the body of animals must be studied. It is said that the studies at college are easily forgotten, especially anatomy. Yes, we do forget, but it is stamped upon our intellect; it by no means follows that this study did us no good.

The best surgeons will not perform a difficult operation off hand, but will consult special books, getting the views of different operators and study out the best method.

Students have to study subjects that are distasteful, and think if they could get rid of some of them, especially chemistry, their studies would be delightful, but by a little hard work they get along with comparative ease; they can not follow their tastes, but the dictates of duty.

Some students commit subjects to memory and repeat it and forget it the next day; there was a special effort for a certain thing and then a collapse of the memory. It takes a year or two of study to really learn how to study. Those entering college and not having a preparatory training are all

at sea in the way of using their forces, and as much may be said of professors; some of them are eminent for their learning, but fail in the manner of imparting knowledge.

What the veterinary profession wants is a better class of men, and the remedy lies with the colleges by not admitting men to enter without passing a matriculation examination. This year an Act has been passed by the New York Legislature organizing a preliminary education for medical students. At the time the bill was presented I was asked the propriety of having the veterinary profession represented. The people of the State of New York have not sufficient interest and faith in veterinary colleges to secure a State appropriation, and it has become necessary to apply the fee of the students for the salaries of the professors, which is a detriment to their advancement.

An editorial article in the *Medical Record* a short time ago stated that the didactic lecture has suffered a great decline in relative importance, as compared with other methods of imparting professional knowledge, and prophesies a still further decline in the near future, and that it will gradually give way to a judicious and well ordered system of recitations. A lesson will be assigned in a text book and recited, and the medical instructors will assume the functions of the regular teacher of science, which is now the method in the medical departments of a free university.

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## TUBERCULOSIS.

BY M. ARLOING, Director of the Lyons Veterinary College.

(Continued from page 399.)

Let us add a word still to these considerations, to say that the study of bovine tuberculosis will perhaps reveal some facts which will present this malady under a still more formidable light.

M. Toussaint, some years since, pointed out the virulence of the blood in a case of bovine tuberculosis and in one of human phthisis. M. Courmont, assistant to the Faculty of Medicine of Lyons, has found in tubercles of the pleura of an ox a microbe which seems to have taken the place of Koch's

bacillus, and the cultures of which produce simultaneously tubercles and an affection of the blood in the animals inoculated. M. Courmont has probably discovered a case analogous to that encountered by M. Toussaint. If these examples were somewhat frequent in the ox, one sees how the flesh of the affected animals would be dangerous.

*Measures to be taken against tuberculous flesh.*—To sum up, scientific prudence requires that we should regard as injurious, at all times and in all conditions, the flesh of animals in which the lesions of tuberculosis are present. Its nocuity present or latent will, of course, probably be proportional to the extent and the softening of the tubercular lesions. That is to say very distinctly that the guarantees given to consumers by Gerlach, by Johne, and by the French law appear to us insufficient, although since the decree of the 28th of July, 1888, the number of seizures has increased in the majority of abattoirs, notably at Lyons.

M. Lydtin would permit the use of the flesh of animals attacked with tuberculosis, "*if the lymphatic glands still showed themselves exempt from every morbid lesion.*" But since there perhaps does not exist in the ox a tuberculous focus without accompanying hypertrophy of the lymphatics of the organ affected, the license would entail the seizure of all tuberculous animals. It is better not to disguise the means, and to pronounce clearly for the total seizure of all flesh coming from animals struck with tuberculosis, whatever the extent and the state of the lesions and of the flesh.\*

The flesh seized, with the exception of the suet, ought to be so treated as to render it unsuitable for the feeding of animals.

It will doubtless be objected that bovine tuberculosis is not the only source of human tuberculosis. We know that well; we are even persuaded, unhappily, that it is the least

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\*At the Congress held in Paris in 1888 for the study of tuberculosis in man and animals, MM. Degive and Van Hertsen, of Belgium; Thomassen, of Holland; Robinson and Cope, of the United Kingdom; Siegen, of Luxemburg; Aureggio, Butel, Spillman, Lefebvre, and Arloing spoke or read notes demanding the absolute prohibition of tuberculous animals.

important source. But that is not a reason for wittingly creating new foci of contagion and of predisposition, for I well believe that no person in the Congress would dare to take the responsibility of categorically affirming that, in any case, the use of tuberculous flesh would be free from danger.

Several of our associates have pointed out the frequency of tuberculosis among pigs of certain feeders. In most cases, as M. Veyssière has shown, tuberculosis of the pig descends by contagion from that of the ox. M. Moulé and M. Peuch have spoken, the one of the frequency of tuberculosis of fowls, and the other of its inoculability to the rabbit. We know that the malady exhibits the characters of an enzootic in some important poultry yards. It appears to us useful to treat the flesh of these animals in the same manner as that of tuberculous subjects of the bovine species.

*Compensation.*—Although, in the opinion of M. Lydtin, the prohibition of the flesh of tuberculous animals should not extend to all subjects, it was nevertheless proposed at the Brussels Congress to award compensation for all subjects seized at the abattoir. He considered that measure an excellent means of avoiding the sale of animals attacked with tuberculosis.

We ought, *a fortiori*, to propose the principle of compensation when we ask a vote in favor of total seizure in all cases of tuberculosis, without distinction.

Almost all the veterinarians who took part in the discussions of the Congresses of 1883, 1885, and 1888, claimed compensation as to the corollary of the seizure or interdiction of tuberculous flesh.

An opinion of great value in this respect, and one that I am pleased to cite, is that of M. Van Hertsen, who for a long period has had charge of the inspection of the abattoir at Brussels. "Although quite sharing the opinion of those who are in favor of total seizure of all tuberculous flesh," said M. Van Hertsen in 1888, "it would be impossible for me, despite the confidence with which I am honored by the communal administration of Brussels, to carry this idea into practice, if in executing it I could not rely upon partial or total compen-

sation. This is the arm furnished by M. Lydtin to destroy the plague of bovine tuberculosis—compensation for slaughter of the animals attacked or suspected of the disease, compensation for the seizure and destruction of tuberculous flesh because there is danger in consuming it.”

It is necessary to examine whether compensation ought to be granted in every case of seizure. M. Rossignol presented some important observations to the Brussels Congress. He drew a distinction between the lean animal with a diseased aspect, in which tuberculosis may be suspected, and the fat animal, in good external condition, in which tuberculosis exists unknown to the purchaser and the seller. In the second case it is proper to award compensation, but in the first it ought to be refused, lest the trade in inferior and doubtful animals should become a very lucrative business.

The proposition of M. Rossignol is equivalent to compensating the conscientious and honest rearer or butcher, and of leaving to the cost of their owner the animals whose condition betrays some internal lesion—animals which should have been in good faith, notified to the sanitary service as suspected of tuberculosis.

The idea is excellent in the main. But one may ask whether in practice it would not raise some great difficulties. Upon what basis would the distinction between fat and lean animals be established? There is a scale of degrees of fatness as numerous and varied as that of colors. It is greatly to be feared that the decision of the inspectors would often raise protests, and that they would be taxed with being arbitrary.

The duty would be much more simple if no distinction were established. In adopting the proposition of M. Rossignol, the cost would not be heavy, for tuberculous animals in almost nine cases out of ten are found in the category of passable or middling.

At what rate would it be necessary to fix the amount of compensation?

The amount of compensation ought to be calculated on the actual loss imposed upon the proprietor or the butcher by the seizure.

M. Lydtin estimates at 34.18 per cent. of the whole the value of the utilizable parts of the carcass of a tuberculous beast (hide, horns and hoofs, suet), and at 65.22 per cent. of the whole the loss caused by the prohibition of the flesh; that is to say, the parts seized would represent about two-thirds of the value of the animal.

Such being the case, it seems to us necessary to give an indemnity equal to two-thirds of the value of the subject. It is equitable, we might almost say it is useful from certain points of view, that the owner should bear a part of the loss. So we would readily fix the rate of compensation at the half of the total value of the live subject. Moreover, to avoid certain expenditures which would press unduly on the common fund, we would limit the maximum sum of the compensation to 300 francs (about £15).

We will add that if the Congress should find a simple and practical method of separating tuberculous animals into two categories, we would gladly support the view of M. Rossignol, which excludes speculation in a matter where the public treasury is concerned.\*

#### *B.—Milk.*

On this point we may be brief, for we do not know any protest in favor of the milk of tuberculous cows. However, before presenting some conclusions, we shall give a rapid sketch of the knowledge acquired regarding the nocuity of milk.

M. H. Martin, some years since, inoculated a certain number of samples of milk offered for consumption in Paris, and several communicated tuberculosis to the guinea-pig.

Whence came this infectious milk? From cows suffering from tuberculous mammitis, would reply Bollinger, Klebs, Cohnheim, Peuch and Nocard, who previously had concerned

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\*The principle of compensation is accepted and sustained for tuberculosis in a bill presented to the French Chamber by two deputies, MM. Camescasse and Ribot, and approved and declared urgent by the Thirty-third Commission of Parliamentary Initiative. In this bill compensation is fixed at the half of the value of the animal if it is examined while alive and slaughtered by order, and at one-fourth if the animal is inspected at the abattoir after it has been killed.

themselves regarding the virulence of milk. It seems then, at the outset, that it might be easy to prevent the entrance of this unwholesome aliment into consumption.

But M. Bang of Copenhagen has remarked that three weeks and sometimes nearly a month may elapse between the commencement of the mammitis and the moment when the lacteal secretion loses its natural characters, during which period it is almost impossible to distinguish this mammitis clinically from a non-tuberculous mammitis, and yet the milk secreted at this time, despite its good appearance, contains Koch's bacilli.

The veterinarian when consulted at this period is exposed to the risk of passing for consumption a veritably dangerous milk. But further, M. Bang's careful observations have enabled him to establish twice in twenty-one cases the virulence of the milk furnished by cows attacked with general tuberculosis, where the udder was perfectly healthy.

If the animals which furnish the infectious milk are not declared to the authorities, or if their disease is difficult to diagnose, they become, unknown to us, extremely dangerous.

The virulence of milk infected by Koch's bacilli extends, as Galtier and Bang have proved, to the industrial products derived from milk, unless they have been manufactured with the aid of an elevated temperature.

M. Bang has sought to determine in a precise manner the temperature necessary to destroy the virulence of tubercular bacilli contained in milk. He found that this was attained by a temperature of  $85^{\circ}$  C., maintained for five minutes. When the heating did not exceed  $75^{\circ}$ , the milk still showed itself more or less virulent.

It results from these experiments which we have summarized that we ought to distrust every cow that presents symptoms of tuberculosis. If certain cows with the external signs of good health should offer alterations of the mammary gland or of one of the quarters, it would be doubly necessary to distrust such subjects. In such a case it would be necessary to determine the nature of the mammitis. One may search for bacilli in the altered milk furnished by the animal, or

make inquiry regarding the state of the udder at an earlier date. If the mammitis is tuberculous, says M. Bang, it will be learned that a tumefaction of the udder has existed at a period more or less remote from the beginning of the alteration of the milk.

When the diagnosis has been made, the cow ought to be treated as a tuberculous animal—that is to say, sequestered or slaughtered, according to the measure adopted; with regard to the milk, whatever its character may be, its sale and consumption for man ought to be absolutely interdicted. The use of it for feeding animals on the place might be permitted, after it had been thoroughly boiled for a few minutes.

The milk, then, may be dangerous when the udder presents no sign of tuberculization. It hence results that all cows ought to be submitted to a careful surveillance. General surveillance is impossible, but it might be regularly exercised in all dairy stocks kept for the production of milk in the interior of towns, that is to say, in localities where a previous authorization from the Council of Hygiene is necessary for the opening of the business.

M. Lydtin has shown in his report of 1885 that the surveillance of dairy stocks can give good results only when the proprietor lends his assistance to the authorities. To be insured of this assistance, the authorities of the city of Carlsruhe have not granted the permission requested until after a kind of contract has been made with the petitioner, by which the latter binds himself to submit to a series of measures or precautions which have the result of separating phthisical animals.

We reproduce here some of the clauses of this contract:

“The local council of health charges itself with the control of the production and distribution of the milk of the establishment of Mr. X., who on his side binds himself:

“To accept for milking purposes only cows belonging to breeds which ordinarily furnish good milk.

“To use especially animals that have had from two to six calves, and not to employ older cows.

“To exclude from his business every animal that ema-

ciates, whose hair is dull without gloss, which coughs or has a discharge, or which carries swellings in the neck, the prepectoral region, between the thighs, at the inferior region of the chest or of the belly, tumors which are caused by an alteration of the lymphatic glands, or an infiltration or subcutaneous dropsical exudation.

“To ascertain daily the state of the rectal temperature of the milch animals, in order to thus control the state of their health.

“To remove from his premises, whenever the veterinary surgeon shall have recognized the necessity, every milch animal in which a temperature sensibly different from the normal ( $38.5^{\circ}$  to  $39^{\circ}$  C) shall have been observed for several successive days, and to do the same for every animal in which any other symptom of disease shall have been recognized.”

Why should not authorities take analogous precautions whenever they intervene previous to the opening of a dairy?

Whatever one may do, the measures will have only a restrictive influence. Hence all milk whose source is not thoroughly known is suspected milk. The most elementary prudence demands that it should be regularly submitted to boiling before it is consumed.

*Conclusions.*—The considerations which we have just exposed make it our duty to submit to the Congress the following resolutions:

The International Veterinary Congress declares:

- a.* That the flesh of tuberculous animals—mammalia and birds—whatever may be the degree of tuberculosis and the apparent quality of the flesh, ought to be eliminated from the consumption of man and of animals.
- b.* That it is necessary to permit the utilization of the hide and horny structures of tuberculous cattle after they have been disinfected, and the utilization of the suet if required.
- c.* That it is expedient to accord an indemnity equal to one-half of the value of the live animal, in the case of a subject of the bovine or porcine species; or

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- d. That it is expedient to accord an indemnity equal to one-half of the value of the animal, if the subject was good and did not permit one to suspect the existence of tuberculosis.
  - e. That the use of milk from tuberculous cows for the alimentation of man ought to be interdicted.
  - f. That cow-stocks kept for the production of milk in large towns or their vicinity ought to be submitted to a suitable surveillance.
  - g. That it is necessary to spread by every possible means the custom of boiling milk before consuming it, whenever its origin is not known.

If the Congress considers that it can adopt these propositions, we are convinced on our part that it will serve usefully the interests of public hygiene, and also, notwithstanding appearances, those of agriculture in every civilized country. An enemy so redoubtable as the tuberculous virus, deserves to be combated continually, even by force of money.

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## UNITED STATES VETERINARY MEDICAL ASSOCIATION.

### TWENTY-FIVE YEARS WORK REVIEWED.

An address delivered at the 26th Annual Meeting of the Association,  
by ex-President R. S. HUIDEKOPER, V. S.

(Continued from page 408).

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*Twentieth Annual Meeting.*—Was held at the American Veterinary College, September 18th, 1883.

Drs. Huntington, W. H. Hoskins, R. Kay, W. C. Bretherton, W. D. Critcherson, Austin Peters, Cotton, E. A. McLane, B. D. Pierce, F. E. Rice, J. Skally, C. T. Goentner, Alex. Glass, J. C. Gardner, W. H. Pendry and F. J. Hanshew were elected members.

The election for officers resulted in the choice of W. B. E. Miller, President; W. J. Coates, Vice-President; C. Burden, Treasurer; C. B. Michener, Secretary; Drs. Liautard, L. McLean, Robertson, Hoskins, Lockhart and Stickney, Board of Censors.

*Twenty-first Semi-Annual.*—Was called to order at Young's Hotel, Boston, March 18th, 1884.

Drs. E. Burget, B. L. James and R. S. Huidekoper were elected members.

*Twenty-first Annual Meeting.*—For the first time was held west of the Alleghenies, at the Grand Hotel, Cincinnati, Ohio, September 16th, 1884.

Drs. W. R. Howe, J. H. Detmers and D. M. Schaeffer were admitted as members.

The Board of Censors was increased to seven. The death of William Saunders was announced.

The election of officers resulted as follows: President, W. B. E. Miller; Vice-President, L. H. Howard; Secretary, C. B. Michener; Treasurer, C. Burden; Censors, Drs. Liautard, Robertson, Hoskins, J. C. Meyer, Geo. Corliss, Bryden and Crowley.

A committee of three was appointed to confer with the Faculties of the Veterinary Colleges and Schools of North America to discuss the advisability of adopting an equal standard of excellence on examination. The committee consisted of Drs. Hoskins, Howe and Bryden. A number of papers were presented.

*Twenty-second Semi-Annual.*—Was held at Young's Hotel, March 17, 1885.

Drs. Walton, Agersborg, Hawk, W. H. Leland, Dyer and Humphrey were admitted as members.

*Twenty-second Annual Meeting.*—Was held at the American Veterinary College, December 15th, 1885. The following officers were elected for the year:

President, L. McLean; Vice-President, J. B. Cosgrove; Treasurer, J. L. Robertson; Secretary, C. B. Michener; Censors, Drs. Dixon, Lockhart, Corliss, Crowley, Miller, Field and Osgood.

Action was again taken in regard to the position of Veterinary Surgeons employed in the Army.

Dr. Liautard offered to add a gold medal of the value of \$50 to the prize already offered by the Association for the best paper presented, which was accepted.

*Twenty-third Semi-Annual.*—Was held in Boston. Proper notice not having been given, there was no session of the Comitia Minora. The legality of the meeting was questioned and the remainder of the day was occupied by the discussion of a few cases and papers.

*Twenty-third Annual Meeting.*—Was held at the Rossmore Hotel, New York, September 21st, 1886.

Seventeen new members were admitted: Drs. D. E. Salmon, Francis Bridge, Jas. Walrath, R. C. Jones, C. S. Bridges, D. D. Lee, K. Winslow, E. C. Beckett, Thos. Bland, G. C. Vanmater, W. S. Cuff, Wm. Rose, T. S. Butler and Wm. R. Harris.

Dr. Liautard was chosen President for the ensuing year. Drs. Zuill, Vice-President; C. B. Michener, Secretary; James L. Robertson, Treasurer; Messrs. Lyman, Huidekoper, Dixon, Field, Rose, L. McLean and Osgood, Censors.

\$100 was appropriated toward the erection of a monument to Henri Bouley, at Alfort, France.

A prize was awarded to a paper by P. S. Butler.

*Twenty-fourth Semi-Annual.*—Was held at the University of Pennsylvania, Veterinary Department, in Philadelphia; fifty members answering to the roll call. Fifteen new members were added to the roll.

After extensive committee reports, Dr. D. E. Salmon presented a paper on "Contagious Pleuro-Pneumonia," which was followed by an extensive discussion and resolutions in regard to the duty of the National Government to its suppression and prevention.

This meeting was honored by the presence of Professors McEachran and Lyford.

*Twenty-fourth Annual Meeting.*—Was held at the American Veterinary College, September 20th, 1887. Again fifty members answered to the roll call. Twelve new members were admitted. The following officers were elected for the year: President, Dr. Huidekoper; Vice-President, J. C. Myers, Jr.; Secretary, C. B. Michener; Treasurer, J. L. Robertson; Censors, Drs. Dixon, Lyman, Hoskins, Zuill, Rose, Burden and L. McLean.

*Twenty-fifth Semi-Annual.*—Was held at the rooms of the Medico-Chirurgical Faculty, Baltimore, Md., on March 20th, 1888. Again nearly half a hundred members answered to the roll call. Twenty-three members were admitted.

A resolution was adopted expressing confidence in the work of the Bureau of Animal Industry, and protesting against the passage by Congress of the Palmer Bill. Dr. Salmon presented a paper on "Hog Cholera," and another on the "Mediate Contagion of Contagious Pleuro-Pneumonia." Dr. Clement presented a paper on the "Pathology of Contagious Pleuro-Pneumonia," which was richly illustrated by a large collection of specimens, fresh and preserved, of the disease.

*Twenty-fifth Annual Meeting.*—Was held at the Rossmore Hotel, September 18th, 1888. Thirteen new members were admitted.

The following officers were chosen for the ensuing year: President, Dr. Huidekoper; Vice-President, Dr. Dixon; Secretary, Dr. Hoskins; Treasurer, Dr. Robertson; Censors, Drs. Zuill, Rose, Winchester, Wray, Howard, Clements and McLean.

Dr. Huidekoper presented a paper on the "Origin of the Domestication of the Horse." After a discussion on bovine tuberculosis a committee was ordered to draft resolutions in regard to the contagiousness of this disease to man, and to present them to the Medical Congress then in session at Washington. Dr. J. C. Myers, Sr., gave an account of the disease known as "Mad Itch in Cattle."

This completed the work of a quarter century. The meetings were always pleasant affairs socially, and whatever might have been the divergence of opinions during the day, and they have often been so great as to become personal, the evening re-united all present, and we learned to know each other and to fill the want of professional friendship which is felt by many who stand alone in new localities. Some meetings were replete with papers, and it is to be regretted that we have not a record of many of the transactions. Other meetings, and there are unfortunately many of them, have been devoid of any public interest, either from lack of proper sense of duty

on the part of those who might have furnished intellectual food to the others, or from, in many cases, the heedless interference, and delay of the proceedings by subjects of business (?) and trivial matters which might have been left to one side. For the future we should remedy these errors. We should confine our "business" to the limits of what is absolutely necessary. We should take more accurate notes of cases and prepare papers and present them here, ready to defend their value. Veterinary literature has become an established fact in this country, and we should all aid in its improvement. The improvement of the education of our successors is a serious duty we have to perform. This lies not only with those connected with veterinary schools, but also with the whole profession, for it is the latter who have the power to build up or tear down an institution, by furnishing to it or withholding from it, students. If they demand but little instruction, but a pittance will be given. If they will only study where every facility is given, the schools will vie with each other in increasing the facilities for a complete education. The improvement of the position of our colleagues in the army offers a subject of national importance in which we must all aid. When we can see the veterinarian of the army an authority on the subject of animal industry, a factor of the government, a social peer of the best educated officers of the country, our profession throughout the land will have reached its proper recognition. We have a great deal to accomplish, but it can be done if we work together and are industrious.

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## REPORTS OF CASES.

*"Careful observation makes a skillful practitioner, but his skill dies with him. By recording his observations he adds to the knowledge of his profession, and assists by his facts in building up the solid edifice of pathological science."*—VETERINARY RECORD.

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### A VAGINAL TUMOR FROM A TWO-YEAR-OLD FILLY.

By J. SMITH, V.S., Gettysburg, Ohio.

August 31st, I was telephoned to attend a two-year-old filly on the farm of John Clark, south of Bradford Junction

The case had been diagnosed to be rupture of vagina and in a dangerous condition. On arriving at Mr. Clark's I found the colt with a continuous bloody discharge from the vulva. I at once proceeded to make an exploration per vaginum. This revealed the existence of a tumor filling up the vaginal canal, and was attached by a short, thick pedicle to the roof of the vagina a little to the right and near the cervix. Was spheroidal in form, irregular on surface, tolerably firm and resisting, and divided on one side by many lobes and deep fissures. The other side irregular but without lobes. The color was little different from its adjacent parts. Owing to the mobility of its surroundings the pedicle could be withdrawn some distance. Then with needle armed with a long double, heavy, silk thread pierced its middle and in this way enclosed it in a tight double ligature. Then by a few cuts with a bistoury the pedicle was divided, and the tumor drawn out. Hemorrhage at once ceased and of course nothing could be seen of the operation, save the ends of thread, which was purposely drawn and left out. Then hydrag. bi phlor. enemata was administered, and as she was very weak from fatigue and loss of blood, left a few stimulant draughts with mineral tonics, with attention to diet. Visited her in couple of days; found her doing well, as she has ever since. The tumor weighed just three pounds. Will say those in charge of the colt had repeatedly seen her discharging a little blood from the vulva before the tumor was removed, but being slight did not regard it. For the sake of preservation I brought the tumor home, and want to state that its vascularity was so considerable, though treated antiseptically, and changed every day, its hemorrhage continued just four weeks, with very little change of color and no perceptible diminution in size. At the end of that time it was suspended in alcohol, and is now in my office apparently unchanged. Williams, in his work on surgery, and Fleming, in his great work on obstetries, each say vaginal tumors in the mare are not common.

## WHAT WAS THE CAUSE?

BY CHAS. H. PEABODY, D.V.S., Providence, R. I.

About September 25th there was a severe thunder storm here. The same night Mr. Brown found one of his cows lying down in the pasture. He got her up, and she was driven to the barn apparently all right.

On the next day she appeared dumpish, but ate well and ruminated. The following day, however, her eyes, bag, and every part of her that should be white, showed very red in color, as though, as Mr. Brown expressed it, "The blood was coming through the parts."

Her milk did not drop off much in quantity, and in five or six days the cow appeared all right, but the skin began to peel off all over the body wherever the hair was white.

Where there were red hairs the skin was healthy.

It would peel off *between* two spots of red, which would not be affected at all.

I saw the cow last Sunday, and she appeared as well as any cow in the herd, only for the peeling of the skin where there were white hairs.

Was it caused by an electric current, and if so, why should only the white spots become affected?

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## FRACTURE AT THE HEAD OF BOTH FEMURS IN A COW.

By THE SAME.

The following case to me was quite unique:

I was called on January 14th about six miles out to see a cow.

History: The cow had calved thirty-six hours before and had been all right until evening, when she suddenly dropped and could not get up.

I diagnosed the case as parturient apoplexy and gave a cathartic, etc. I saw the animal on the next day, the 15th, and on the two following days, when she appeared quite bright and struggled to get up.

I saw her on the morning of the 18th with both hind ex-

limbs extended backward. Her pulse was eighty, respiration forty, temperature one hundred and four. Taking hold of her right leg you could put it in any position, and could hear crepitation. On turning the animal over I found the other leg the same.

I diagnosed it as either a fracture at the head of the femur or dislocation of both femurs. I advised the owner to destroy the cow, and in the afternoon I would call and make an autopsy.

On my arrival at the time specified the owner had cut through the symphysis pubis and destroyed it. He had also cut both the muscular and ligamentous attachments, separating the femur from the pubis.

Enough was left, however, to show me that the coxo femoral ligament of both extremities was ruptured, and also that the capsular ligament and the head of the femur were dislocated, posteriorly in both legs.

This, to me, was an unique accident, caused, I think, by the cow trying to get up on a slippery floor.

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#### RUPTURED STOMACH OF OLD STANDING.

By F. SAUNDERS, D.V.S.

At two o'clock upon the morning of November 11th I received a call to attend an animal said to be suffering from colic. Upon arriving at my destination, I found a chestnut mare suffering intense abdominal pain. I immediately administered one and one-half ounces of chloral, in giving which I noticed a terrible odor coming from her mouth, which strongly resembled that coming from a diseased tooth, and fancied while giving the ball that I felt a loosened molar. The subject presented no flatulency. I remained with her one hour and a half, when I left her, she being well under the influence of the chloral. At 9 o'clock upon the morning of the same day I received another call from the same party, and arrived just as death took place.

The history of this case is a little out of the common run, and is as follows: One month previous to her death they be-

gan to wean her colt, five days after which she had an attack of colic while driving upon the road at night. The following morning at 8 o'clock she appeared to be all right. At 9 o'clock of the same day she had another attack, which lasted about four hours; she was then put upon her former light diet until her death. The result of the post mortem, made one hour after death, was as follows: abdomen enormously distended with gas, upon opening which a large quantity of fluid and feed escaped; peritoneum and intestines highly inflamed; great curvature of stomach ruptured to the extent of seven inches, stomach contained a large amount of food and six small worms; about five inches from the œsophagus upon the anterior face of the fundus of the stomach, was a round hole, the size of a silver dollar; the edges of this hole were entirely healed, showing that it had existed there some time, and beyond doubt was the cause of her repeated attacks of colic. Having never seen a case of the kind before, I thought it might be of interest, and so submit it.

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## SURGICAL PATHOLOGY.

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### PECULIAR MICROBIC TUBERCULOSIS OF CATTLE.

BY MR. COURMONT.

The author has found in the pleuritic tubercles of a cow, which seemed to be affected with ordinary tuberculosis, a micro-organism which is not the bacillus of Koch and which does not resemble any of the various microbes described among the various forms of tuberculosis. Pure cultures of this micro-organisms produce, in the guinea pig, tubercles like those of tuberculosis proper, and grows with great rapidity. The micro-organism is abundant in the blood, and presents some analogy with the microbe described in 1881 by Toussaint in the blood of tuberculous cattle.—*Society of Biology*.

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### CONTRIBUTION TO THE PATHOLOGY OF ANTHRAX.

BY W. ROSENBLATH.

In a series of experiments, Rosenblath has studied the much-discussed question of the passage of the bacteria of an-

thrax from the mother to the foetus. He inoculated guinea pigs in gestation with the virus, and removed the foetus with all necessary care. He then examined sections of tissues, after coloration, making cultures at the same time, and obtained the results similar to those of Strauss and Chamberlain, proving that the passage of the bacteria takes place from the mother to the foetus.—*Archiv f. Anat. and Physiol.*

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### ON THE MODE OF ACTING OF THE BACTERIAS OF ANTHRAX IN THE ORGANISM.

BY MR. EL. METSCHNIKOFF.

In numerous experiments in which the author inoculated the spore of the virus of anthrax in the anterior chamber of the eye of frogs, sheep and rabbits, he observed the proliferation of the bacterias in a little over three hours, and after six hours and a half, saw bacilli anthracis in the form of rods. The bacteridies subsequently reached the form of long threads. After twenty hours numerous leucocytes gathered in the anterior chamber, surrounding the bacteridies. Upon examination, these leucocytes were found filled with colorless bacilli. Under the microscope Metschnikoff saw the leucocytes destroying the bacilli.

In another series of experiments he placed under the skin of a frog a small piece of silk thread loaded with spores of anthrax, enveloped in a piece of filtering paper well sterilized. Comparing then the bacterias of this little mass, which the leucocytes were unable to penetrate, to a piece of silk thread covered with anthrax virus placed in direct contact with the sub-cutaneous tissues, the following results were obtained: In the first case, the bacteridies would develop into bacilli, then in threads; in the second, they diminished in number in proportion to the increase of the leucocytes. In twenty-four hours they had all disappeared.

These experiment show, that in the fight of the organism against anthrax virus, the leucocytes play a very active part.—*Rev. des Sc. Med.*

## ETIOLOGY OF EPIZOOTIC HEMOGLOBINURIA OF CATTLE.

BY V. BABES.

This affection has existed for years back, and is very severe in the herds of Roumania. The following are the principal symptoms: general dullness, high temperature, ( $40^{\circ}$  to  $41^{\circ}$  C.) reddish-brown or red urine, quick death, or recovery in a few days. The post-mortem revealed a hyperemic condition of the true stomach and of the intestine; hemorrhagic œdema, surrounding the enlarged spleen and kidneys; and hemoglobinuria. The author considers this disease to be infectious and endemic, and that it is caused by a specific *diplococcus* penetrating the red corpuscles of the blood. It is less abundant in the large blood vessels than in the parenchymatous organs and are very numerous in the kidneys. These parasites grow in the water of marshy grounds, ponds or ill-kept wells. Once introduced into the digestive canal, they rapidly penetrate the mucous membrane, the sympathetic glands and the blood.—*Rev. d. Sc. Med.*

## EXTRACTS FROM FOREIGN JOURNALS.

## A CASE OF EQUINE TUBERCULOSIS.

BY HARRY OLIVER, F.R.C.V.S., TAMWORTH.

This disease is quite rare among solipeds, so much so, indeed, that it is doubted by many whether it ever occurs in the horse. The following case is therefore interesting, from the fact of the real nature of the existing lesion, and from the queries suggested by the author, who, having known the patient for a number of years, was naturally curious to know how long he had been affected with tuberculosis, and from what source he had contracted it.

Mr. Oliver had been consulted by his assistant in behalf of the horse, in respect to a slight cough with which the animal was affected, and had prescribed some cough balls, which appeared to give him sufficient relief to enable him to continue his work. In a short time, however, he suddenly became worse, and for the first time he looked unhealthy. The breathing was slightly labored; pulse 46; with temperature

nearly normal ; auscultation demonstrating lung mischief, but of an unusual character, there being some dullness and some friction over the whole surface of both lungs.

Blisters were applied and stimulants administered, and, later, aconite, bicarbonate of potash, and nux vomica, and for a few days an apparent improvement was manifest. He then began to lose flesh rapidly, with staring coat, fickle appetite and increasing frequency of the cough. All the appearances became unfavorable, and the case became hopeless.

Consultation was suggested, but declined by the owner. Treatment was continued for a few days but proved useless, and about two months from the day of his first visible sickness, he was destroyed.

Without exaggeration, there scarcely was an inch of healthy viscera in the thoracic and abdominal cavities. The lungs were one mass of tubercular disease, from end to end, the base of the heart had several large nodules attached to it, and the diaphragm on both sides was studded with others of various sizes, as were also the intestines on the outside, throughout their whole length. The liver was enlarged and full of similar deposits, varying from the size of a hen's egg downwards ; the spleen also was much enlarged, and resembled, in a greatly aggravated form, the colored plate of Lymphadenoma in Professor Williams' Veterinary Medicine. The mesenteric glands were fused into one mass near the spinal column, which would have weighed ten or fifteen pounds, every part being more or less affected. The microscopic examination of the specimen made by Professor Penberthy, of the Royal Veterinary College, revealed the parts literally swarming with bacilli tuberculosis, much more numerous and easily found in the spleen and mesenteric glands than in other parts, and also in the lungs.—*Journ. of Comp. Pathology*.

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#### RESORCIN IN VETERINARY PRACTICE.

By M. EHRHARDT. (Zurich).

This new substance is recommended by the author in veterinary practice in various conditions ; as a caustic in the form

of ointment for luxuriant granulations, unhealthy, foul granulating wounds, ulcers, diphtheretic surfaces, etc., and also in the treatment of canker of the foot. It is recommended in skin affections due to vegetable parasites, but is useless in animal parasites, excellent results being obtained by its use in the form of soap, or as a lotion, (one to ten per cent.), or again, in the treatment of erysipelas, traumatic inflammation of the eye (one per cent. solution), stomatitis, metritis and vaginitis, and in various diseased conditions of the udder, such as the various forms of pox, furunculus, catarrhal inflammation, etc.—*Schweizer Arch. fur Thierhuel, Journ. of Comp. Pathology.*

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#### ESERIN INJECTIONS IN CHRONIC SYNOVITES.

In the event of the failure of the blistering and firing treatment in these affections, and of the danger attending the injections of iodine and iodide of potassium, eserin is recommended by Stottmeister as less dangerous and more satisfactory. He operates as follows: The animal being cast, the hair for the extent of a shilling is shaved or clipped from the most prominent part of the enlargement, and this area is then disinfected. The swelling is then compressed with the left hand, in order to make the seat of puncture as prominent and tense as possible. The trocar, previously disinfected, is introduced at this spot, and the fluid in the cavity is withdrawn by means of a syringe. The eserine solution is then injected, the canula withdrawn, and the part submitted to manipulation for a few minutes, with the object of distributing the solution equally throughout the cavity. The eserine solution is used of a strength of 0.5–1 of eserine to from 5 to 10 grammes of distilled water, according to the size of the enlargement, and must be well filtered before use. Ice is applied to the part to subdue the inflammation which nearly always sets in during the twenty-four hours after the operation, or moist swabbs, to which lead and alum has been added, may be employed for the same purpose. The inflammation generally subsides in five days, and a complete cure is effected in from four to six weeks.—*Thiermedizin Rundsch.*

## INTRA TRACHEAL INJECTION OF SALINE SOLUTION IN WEAKNESS OF THE HEART.

BY DR. MOTZ, V.S.

Subcutaneous injections of saline solutions having been advantageously used in human practice, as a cardiac stimulant, Motz experimented with it on horses, employing the intra-tracheal injection as a better mode of administration. He reports the following case :

A horse which had suffered from influenza, and had been ill for six weeks, showed, when first examined, great weakness, and frequently fell down. The cephalic mucous membranes were very pale, the pulse scarcely perceptible, and intermitting every third or fourth beat. Examination of the lung revealed nothing abnormal. The heart sounds corresponding to the perceptible beat of the pulse, were normal, and during the intermission there was an indefinite cardiac murmur. In order to combat the apparent weakness of the heart, fifteen grammes of common salt were dissolved in one hundred grammes of boiled water; the lotion was filtered, and thirty grammes of it were injected into the trachea. Within a quarter of an hour thereafter the pulse became fuller and stronger, and intermitted only every seventh or eighth beat. The injection was repeated after an hour, and doses of iron were administered with the food. On the second day the weakness had abated, the appetite was better, and the animal fell only once. The injections were continued for three days, when a permanent improvement took place, the pulse continuing to be strong and without intermissions.

Since then Motz has repeated this mode of treatment in eight cases of notable weakness, occurring in the course of attacks of influenza. Within half an hour the pulse always diminished in frequency, and this effect continued for eight and ten hours, after which a second injection was given.

Further reports are recommended. — *Biol. Thierarz-Wochens.*

## BIBLIOGRAPHY.

LE BERCEAU DE L'ENSEIGNEMENT VETERINAIRE—CREATION ET EVOLUTION DE L'ECOLE NATIONALE VETERINAIRE DE LYON--1761-1889—(BIRTH PLAN OF VETERINARY EDUCATION—CREATION AND GROWTH OF THE LYONS VETERINARY SCHOOL.)—by Dr. S. Arloing, Director.

This book differs from the generality of newly issued works involving or relating to matters of veterinary science, and is so full of interesting material that we cannot resist the temptation to recommend it to the attention of our readers. It is a work worthy of the repute of the director of that veterinary school which may justly be denominated the fountain head of the veterinary science of the world. A glance at its contents will satisfy our readers of the correctness of this statement. The reader, for instance, will find authentic documents relating to the birth of Claude Bourgelat, to his family and to his first studies. Then he is shown as applying for and obtaining the direction of the Academy of Equitation of Lyons, writing his works on hippiatry, maintaining intimate relations with all the official authorities of Lyons, and impressing them with the necessity of the realization of his favorite project. Mr. Arloing then describes the various steps followed in the establishment of the school, the legislative acts, the plans and sites of the building, and the regulations of the school administration. This is followed along step by step, and the moral as well as the financial growth of that governmental school are thus traced from its creation down to the present time. The author shows, by degrees, the indebtedness which the veterinary profession of the world ought to be proud to acknowledge to France and to the Lyons school for the institution which was thus and then established. In his attempt to do this the author has fully succeeded, and he has done well in methodically and conscientiously presenting the present generation with the history of this birthplace of our profession. It was due to Bourgelat, to the Lyons school and to the profession of which Mr. Arloing himself is one of the chief ornaments.

TRATTATO TEORICO-PRATICO DI MATERIA MEDICA E TERAPEUTICA VETERINARIA, (Theoretical and Practical Treatise of Veterinary Materia Medica and Therapeutics,) by Professor Lorenzo Brusasco, of the Turin Veterinary School.

According to the author's own statement this book is written principally for veterinary practitioners and veterinary students—with the special object of assisting them in the applications of therapeutics to the treatment of their patients. Assisted by his own experience and studies, and by the results of his own observation and experiments at the clinics of the school in which he is a teacher, his exceptional opportunities have well served him, and Italian veterinary literature is materially enriched by a work which worthily illustrates the standing of the profession in that country.

The book of Professor Brusasco forms a large volume of nearly seven hundred pages, and the material of that branch of veterinary medicine to which it is devoted is ably presented to the reader. The first part, which treats of general pharmacology, with mode of administration, or application of drugs; intravenous injections; cutaneous medication; the manipulations of pharmaceutical preparations, etc., comprises four principal chapters.

The second part is more complicated in its arrangements and forms what may be entitled the solid part of the work. The whole mass of medicaments is divided into seventeen principal groups, each one of them being subdivided into sub-groups or classes.

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## SOCIETY MEETINGS.

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### ILLINOIS STATE VETERINARY MEDICAL ASSOCIATION.

The Illinois State Veterinary Medical Association held its seventh annual meeting at the Sherman House, Chicago, November 6th and 7th.

The Association came to order at 2 P.M. Wednesday the 6th, with President W. L. Williams in the chair.

After the roll-call and reading of the minutes of the previous meeting, the President read his annual address. After touching upon various topics of interest to the welfare of the society, and paying tribute to the memory of his former business partner, Dr. James Brodie, deceased, Dr. Williams spoke at length upon the subject of veterinary journalism.

An effort had been made to start a veterinary journal for the west at Ames, Iowa. The AMERICAN VETERINARY REVIEW was the only strictly veterinary paper on the continent, and did not meet the expectations of the proposed founders of the new journal. Its corps of editors did not show enthusiasm enough in their work, etc.

Dr. Williams granted that there might be much improvement in American veterinary journalism. He cited the proportion of practitioners that took *any* veterinary literature *whatever*, and asked if thirty cents per head from Illinois practitioners was enough to stimulate much enthusiasm for this State, in the editorial corps of the REVIEW.

After mentioning one or two defunct veterinary journals of this country, he suggested the propriety of properly supporting the REVIEW—our old paper—both by subscription and contribution, and trying to make a success of that before attempting to start a new one.

The election of officers being next in order, tellers were appointed, and Dr. Williams being the only candidate, Dr. Baker moved to close the nomination and instruct the Secretary to cast the ballot for Dr. Williams. After a hearty second the doctor made an appeal to have someone else take a turn at this arduous office.

Dr. Nattress, First Vice-President put the motion and Dr. Williams was elected to his third term of office. The other offices were filled as follows:

First Vice-President, R. W. Storry, Princeton; Second Vice-President, James Bond, Streator; Third Vice-President, J. F. Reid, Decatur; Recording Secretary, J. F. Pease, Quincy, second term; Corresponding Secretary, C. E. Hollingsworth, La Salle; Treasurer, J. F. Nattress, Delavan; Censors, Drs. Casewell, Baker and Redner, of Chicago.

The names of S. H. Kingery, Chicago, 1888, W. F. Weese, Ontario, 1887 and E. W. Lawton, Chicago, 1889, were placed on the membership roll by acclamation.

A. S. Alexander of the *Farmers' Review*, Chicago, was elected to *honorary membership*.

The Corresponding Secretary handed in the report of the Treasurer, and in his own report read a communication from the Indiana Association inviting our members to attend their next meeting, at Terra Haute, Indiana. The invitation was accepted with a vote of thanks and ordered placed in the records.

Correspondence from Dr. A. Liautard was also read, regretting his inability to attend and address the meeting.

Dr. Story, Princeton, read an interesting paper on "Azoturia." He followed the *etiology* and *diagnosis* of the disease according to the latest authorities and personal observation, and for treatment recommended quietude, *venesection*, a *cathartic* and sedatives, with stimulating applications to the loins and early and frequent use of the catheter.

DISCUSSION.—Professor Baker asks for the death rate with this treatment.

Answer.—About *one* in *fifteen*.

Professor Baker's cases in the city are more severe; about ninety per cent. become delirious, anaesthetics are necessary, about forty per cent. are fatal. He thinks cathartics are contra-indicated; believes delirium due to uræmic pois-

oning; gives gelsenium and bromide of potassium. Gets marked *diuresis* without danger to kidneys.

Dr. Williams avoids cathartics; depends on laxatives, as oil, etc.; frequent use of the catheter and plenty of medical non-interference.

Dr. Hollingsworth, of La Salle, read a carefully prepared paper on *enteritis*. He believes in opium or morphia hypodermically, hot fomentations and warm enemas, with sedatives in full doses internally.

DISCUSSION.—Dr. Williams quoted Walley on the theory of torsion of the bowel being the cause of the rapidly fatal form of the disease.

The essayist has not found this in his post mortems. Professor Baker finds an occasional case of torsion, but many careful post mortems fail to reveal any. He finds numerous *Strongyli tetracanthi*. Dr. Williams bleeds now in all plethoric cases of the so-called apoplectic variety.

Dr. Withers coincides, but finds the cases in the city are *not* plethoric as a rule.

Then followed a discussion on varieties of trocars and the manner of using.

Abcesses are caused by dirty trocars and by illy-constructed ones carrying hairs in with them.

The Association adjourned to attend the annual banquet.

The meeting reconvened at 2 P.M. Thursday, the 7th, to listen to an interesting paper by Dr. Hinebauch, of Lafayette, Indiana, on "Diathesis and Idiosyncrasy."

The paper was not discussed.

The Standing Committees were appointed and three committees failing to report were discharged. The Committee on Legislation reported through their Chairman, Dr. Casewell. The funds of the special assessment were fully accounted for and the balance turned over to the Treasurer.

The doctor reported that strenuous efforts had been made to have the bill pass, and he, as well as President W. L. Williams and Professor Baker had appeared before the legislative committees to urge its passage. The original bill had been made as strong as dared, but had been changed by the Committee on Dairying, etc. It had failed, partly by reason of an antipathy in the last legislature toward *boards* and *commissions*, but most by opposition on the part of younger men of the profession, both *in* and *out of* the Association, who thought the bill not strong enough.

This the doctor censured highly and proposed that the next committee be proposed of young men, as *they* and not the older ones with well-established practices would be benefitted by a bill.

This report was accepted as the report of the committee, and ordered, together with the corrected bill, spread upon the minutes.

Then followed a paper from Dr. Lanigan of Wenona on the "Principles of Feeding." As the writer was unavoidably absent, the paper was read by the corresponding secretary and was not discussed.

A paper by Dr. J. T. Nattress on the subject of "Parturient Apoplexy," brought out a long discussion on the pathology of the disease.

Professor Baker considers the term *apoplexy* misleading,—it must be an anaemia of the nervous system. Prof. Hinebauch agreed with him. His treatment

is pilocarpin, 15 to 20 grains, eserine 1 to 1½ grains, not repeated. Cold to head and pack to the body.

Ques. by Williams: Why do you apply cold to the head for anaemia of the brain? The professor acknowledged it was inconsistent with the theory, and he did not see that it did any good.

Objected by Dr. Pease that these cows are always *plethoric* again, is not dilatation of the pupil a sign of hyperaemia?

Ans.: It is also found in anaemia of the brain.

Professors Baker and Withers hold that the disease is due to a lack of use of the nerve energy naturally stored up in the nerve-cells for the act of parturition. The animal dies from coma and collapse.

Pilocarpin and eserine are both powerful nerve stimulants. Dr. Williams admits the *use* of stimulants, but finds it impossible to safely administer them by the mouth. He employs pilocarpin with ice bag to poll and cold wet pack to body.

The Association then adopted resolutions of condolence in the loss of Doctor James Brodie, formerly a member. After voting thanks to the visitors and retiring officers, as also to "our host," the Association adjourned to meet in Peoria during February next.

J. F. PEASE, *Recording Sec'y.*

#### THE LONG ISLAND VETERINARY SOCIETY.

A regular meeting of the Long Island Veterinary Society was held on Nov. 20, 1889, at No. 74 Adam Street, the President, Dr. Geo. H. Berns, in the chair.

The minutes of the previous meeting were read and approved.

The minutes that had been laid over from time to time, namely, from January to June, 1889, were read and approved.

On calling the roll, the following members were found present: Drs. Berns, Breslin, E. Hanshaw, Mustæ, Pendry, Newman, Atchison, Housman, Jamieson.

The Board of Censors reported progress.

Moved by Dr. Pendry, seconded by Dr. Newman, that the question as to whether members of the profession practicing other than on Long Island are eligible for membership in this society, will be laid before December meeting for action. Carried.

Dr. Pendry, Chairman of Committee on Army Veterinary Legislation, made a report in writing, which embodied a bill on the subject. Moved by Dr. Breslin, seconded by Dr. Mustoe, that the report be received and adopted and committee authorized to carry out their suggestions. Carried.

Fifteen dollars was placed to the credit of the committee to meet necessary expenses.

Dr. R. A. McLean, the essayist for the evening, sent telegram stating inability to attend the meeting, on account of having important business in Staten Island.

The following gentlemen were placed in nomination for the various offices to be filled at December meeting: President, Drs. Geo. H. Berns, Wm. H. Pendry, R. R. Bell, R. A. McLean. Vice-President, Drs. J. F. Mustoe, H. Housman.

Secretary, Drs. D. S. Breslin, Samuel Atchison. Treasurer, Dr. George F. Bowers, J. F. Mustoe, F. J. Hanshew. Board of Censors, Dr. Philip Newman, Samuel Atchison, Wm. H. Pendry, R. R. Bell, T. M. Buckley.

On motion the Secretary was instructed to procure a hexograph for the use of the Society. The meeting then adjourned.

After meeting an informal talk took place on the subject whether it would be advisable to allow practitioners, other than those on Long Island, to become members of the society.

Dr. George H. Berns thought that any practitioner, provided he be a graduate, was eligible for membership, as there was nothing in the constitution of the society depriving him of the privilege of becoming a member.

Dr. William H. Pendry thought the same as Dr. Berns, and also said it would be advisable for the reason, that if we confined our membership to Long Island, it would only be a question of time for our meeting to lack interest, from the fact that the same body of men meeting often would have no new ideas to advance in the discussions of the meeting.

Dr. J. F. Mustoe thought it would be wise to confine our membership to practitioners on Long Island only. The history of other societies which he could name would warrant this course; all societies that opened its membership to men from all sections, would in the course of time obtain a disturbing element within its body, which would be the means of destroying the vitality of the society, and there was no reason to believe that the Long Island Veterinary Society would be an exception to the rule, and for this reason he favored the idea of confining our membership to practitioners on Long Island.

Dr. D. S. Breslin thought it was originally intended to confine the membership to Kings County, but after considerable discussion, it was decided to take in all qualified practitioners on Long Island.

The fact that the constitution says nothing upon the subject was in his opinion an oversight on the part of the committee who had that business in charge.

Another reason why membership should be restricted to Long Island is, that in the course of time the membership from New York City or any other city would be able to control the affairs of the society, and they would naturally seek to have the meeting held where it would be most convenient for them, and if your meetings are held outside of Long Island, you cease to be a Long Island Society.

D. S. BRESLIN, D.V.S., *Sec'y.*

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### CONNECTICUT VETERINARY MEDICAL ASSOCIATION.

The annual meeting of this Association was held at the Scoville House, Waterbury, on Tuesday, June the 5th, when the following officers were elected: President, George Bridges, Norwalk; 1st Vice-President, Andrew Hyde, Norwich; 2d Vice-President, Frederick Lamberton, New London; Secretary, Thos. Bland, Waterbury; Treasurer, Nathan Tibballs, New Haven; Board of Censors, E. C. Ross, E. A. McLellan, Harrison Whitney, E. M. Beckley and A. A. Tuttle. Three new members were admitted, viz.: E. M. Heath, Robert Todd and A. E. Brunn.

A regular meeting was held at the Tremont House, New Haven, on Tuesday

September 3d, when only seven members responded to the roll. Those present were Dr. George Bridges, President, and Messrs. Beckley, Todd, Balzer, Whitney, Tibballs and Bland.

Mr. Charles H. Smith was admitted to membership. Messrs. Driscoll and Pierce were proposed by T. Bland and H. Whitney.

Messrs. Ross, Smith, Todd and Bland were appointed essayists for the next meeting, which will be held at the Mahackemo Hotel, Norwalk, on Tuesday, December 3, at 4 o'clock in the afternoon.

THOMAS BLAND, *Sec'y.*

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#### VETERINARY SOCIETY OF THE UNIVERSITY OF PENNSYLVANIA.

The students of the senior class of V. D. U. P., at the opening session, organized a society to be known as the Veterinary Medical Society of the University of Pennsylvania. The first semi-monthly meeting was held on the 29th of October. The following officers were elected: Leonard Pierson, President; Edgar Tully, Vice-President; John H. Eshleman, Treasurer; B. Frank Senseman, Secretary.

Mr. E. S. Muir, Ph.G., read a very interesting paper on "Pharmaceutical advice to the Veterinarian." The lack of care in dispensing veterinary medicine by the ordinary druggist was deplored, and the advantage of dispensing all medicine was brought out.

Mr. H. L. Eddy also read a paper setting forth the pressing demands in the west for properly educated veterinarians. Several interesting cases were reported, and a discussion followed.

The second meeting was held November 12, 1889. After the regular routine of business had been finished, Dr. Huidekoper read a very interesting paper on Veterinary Science in the Army, embracing a history of the service in this and European countries, and the purpose for having an efficient veterinary corps in our own country.

Messrs. Bannister, Batteu, Larzler and Tully engaged in a spirited debate on the question as to whether the veterinarian should have an infirmary? Prof. Zuill, as judge of the debate, decided in favor of the affirmative. Mr. H. A. Meisner, of Baltimore, Maryland, reported a very interesting case of pneumonia delirium and glanders, that came under his observation during the past summer. Mr. E. Mayhew Michener, Colanar, Pa., reported a case of dysurea in a horse working in a power; trouble was caused by the neck coming repeatedly in contact with the bar in front. After some suggestions as to the future work of the society from the members of the faculty and alumni present, the meeting adjourned to meet November 26, 1889.

Respectfully,

B. FRANK SEUSMAN, *Sec'y.*

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CORRESPONDENCE.

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## "ARMY VETERINARY LEGISLATION."

*Editor American Veterinary Review :*

DEAR SIR—As soon as a bill is decided upon, for introduction to Congress, which secures to the present army incumbents the lowest grade in the proposed bill, and also fair chances for examinations for the higher grades, I shall be happy to contribute my share toward the good work, but it would be unreasonable to expect us to give our money and influence to a bill which would "kick us out of the service" after spending years therein; as a graduate of ten or fifteen years standing would scarcely compete successfully against a young man fresh from college.

AN ARMY VETERINARIAN.

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FORT RENO, INDIAN TERRITORY, }  
HEADQUARTERS, FIFTH U.S. CAVALRY, Dec. 13, 1889. }

SIR.—Your unintentional remark in the last issue of the REVIEW that I had entered the army as veterinarian after my many protests against this service in its present state, places me in a rather embarrassing position before your readers. In the first place an apology from me is in order for having entered the army, but I must qualify this apology by saying that I entered it for the purpose of pushing the interests of the proposed army veterinary bill; I will also say that I do not intend to remain while things are in their present state—which is simply abominable—and that if the United States Veterinary Medical Association's bill fails to pass, I will quit the service instant.

If the readers of the REVIEW will remember, there was an army bill published in its columns in October, and at the same time it was suggested that a fund be opened for the support of this bill. Such a fund has been opened and some subscriptions have been made. Now in reference to this bill, I beg to state that I have withdrawn same in favor of a more modified one by the Committee on Army Legislation of the United States Veterinary Medical Association, which bill, in the

opinion of many, has the better chance of passing both houses, and moreover has the sanction and support of prominent army people. I would suggest that the present fund be given to the support of the bill—(I authorize my subscription to be used for this purpose,) and I know the REVIEW will not refuse its valuable assistance. I thank the REVIEW for its commendation of my feeble efforts in behalf of the army service, and though I now work as a private in the cause, still I will continue to do that work with as much enthusiasm as if I was at the head of the movement. By placing the agitation in the hands of Dr. Huidekoper, whose name is familiar to every veterinarian in the United States, and who is ably seconded by Dr. Lemay of the Seventh Cavalry, and Curtice of Washington, I have no doubt that it has fallen into the best hands in the country. I request all my friends in the profession who have promised me their support to transfer said support to this bill of the United States Veterinary Medical Association. By elevating the standard of the profession in the army we elevate it all over the country, and it will be a means indirectly of securing the passage of State laws for our profession.

GERALD E. GRIFFIN, D.V.S.

## SUBSCRIPTION LIST TO THE ARMY VETERINARIAN FUND.

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AMERICAN VETERINARY REVIEW (already announced) .....	\$25.00
G. Griffin, D.V.S., Eighth U. S. Cav.      “ .....	25 00
John Robertson, V.S., Second U. S. Cav., (already announced).....	20.00
R. R. Morrison, D.V.S., (New York City).....	20.00

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## OBITUARY.

JAMES BRODIE, V.S.

The following resolutions were acted upon by the Illinois State Veterinary Medical Association, in regular convention assembled, and unanimously adopted.

SHERMAN HOUSE, CHICAGO, Ill., Nov. 7, 1889.

*Whereas:* An all-wise Providence has seen fit to remove from among us our professional brother and former co-labor-

ator, Jas. Brodie, V.S., last of Canon City, Colorado, an enthusiastic and enterprising veterinarian, whose studious and gentlemanly qualities bid fair to place him in the very front rank of our profession; be it hereby

*Resolved:* That we, the Illinois State Veterinary Medical Association, deeply lament his loss to the Association and to the profession at large, and that we heartily sympathize with his family in their bereavement.

*Resolved:* That these resolutions be spread upon the minutes of this Association, and copies be sent for publication to THE AMERICAN VETERINARY REVIEW, and to *The Journal of Comparative*.

*Resolved:* That a copy of these resolutions be forwarded to the family of the deceased.

C. E. HOLLINGSWORTH, Cor. Sec'y.

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WM. CUTTING, V.S.

At a meeting of the Rochester Veterinary Medical Association, the following resolutions were adopted in memory of Dr. William Cutting, who died at his residence in Pittsford, N. Y., Oct. 10th:

WHEREAS: It has been the will of Divine Providence to remove from our midst by death the oldest member of the profession in Monroe County. Dr. Cutting was noted for his straightforward dealings in all business transactions and a credit to the profession,

*Resolved:* That we, the Rochester Veterinary Medical Association, do hereby express the feelings which we hold for him as a genial and noble man, and as a member of our Association. And furthermore

*Resolved:* That we tender our heartfelt sympathies to relatives and friends of the deceased in this their time of great affliction. And also

*Resolved:* That a copy of these resolutions be transmitted to the relatives of the deceased and published in the daily papers, and that the members of the association attended the funeral in a body.

A. DRINKWATER,  
JAS. C. MCKENZIE,  
ALBERT TEGG.

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NEWS AND SUNDRIES.

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AMERICAN VETERINARY REVIEW FOR SALE.—Vols. 8, 9, 10, 12, newly bound in half sheep; Vol. 11 unbound except Nos. 5, 10, 11; Journal of Comparative Medicine and Surgery, Vols. 7, 8, 9 bound, vol. 10 unbound. For price and further information address R. F. B., Box 37, Rochester, New Hampshire.

WANTED.—One copy of July AMERICAN VETERINARY REVIEW, 1886—by Dr. T. Butler, V.S., of Davenport, Iowa, who will pay one dollar.

RABIES AMONG DEER.—The deer of Ickworth Park, England, having become diseased, Mr. Adami, the demonstrator of pathology at the University of Cambridge, was invited to study the causes of the trouble. An inquiry by the agents of the Privy Council had already been made, which had declared the disease to be anthrax. Mr. Adami was not able to confirm this decision, but after a thorough study reported the cause to be rabies, a disease that has not often been found among deer. The *British Medical Journal* states further that Mr. Adami was so unfortunate as to inoculate himself. On the seventeenth day after this accident he resorted to Pasteur's Institute at Paris, and was treated for inoculated hydrophobia. On the ninth day after the beginning of the treatment he had premonitions of the disease, but these did not progress, and the unfortunate pathologist now considers himself cured and protected.—*N. Y. Medical Record*.

CORNELL UNIVERSITY'S MEDICAL ASPIRATIONS.—A recent report by President Adams, of Cornell University, seems to put forth a "feeler" after a medical department, in order that Ithaca may have a full-orbed university, *totus, teres atque rotundus*. President Adams is reported to have expressed the wish that such a department, with a large endowment, might be established in New York or Brooklyn, which might very properly be styled "the College of Medicine of the Cornell University." Is this a bid to the Bellevue Hospital or the Long Island school to come in under the ægis of Cornell? They are about the only ones remaining that have not a placental attachment; but neither of them can be said to enjoy "a large endowment."—*N. Y. Medical Record*.

# AMERICAN VETERINARY REVIEW,

FEBRUARY, 1890.

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## EDITORIAL.

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MCGILL UNIVERSITY'S NEW FACULTY OF COMPARATIVE MEDICINE AND VETERINARY SCIENCE.—The Montreal Veterinary College definitely absorbed by McGill University—will the profession gain by the change?—Prof. McEachran's grand efforts and grand professional results—our compliments and our regrets. PAQUIN VACCINE LABORATORY.—Our past references to the necessity for such institutions—efforts in that direction—the opening offered to veterinarians and biopathologists—the work of Drs. Faust and Salmon and Professor Law—claims of the new laboratory—hopes and wishes for its success—this depends on the material produced—vaccines have proved their value. DIARRHŒAS AND SCOURS.—Dr. G. A. Stockwell's article—a comparative pathologist is a veterinarian—the treatment recommended—pepsin as the basis—Parke, Davis & Co.'s preparations—reports of their uses—results obtained—more wanted.

MCGILL UNIVERSITY'S NEW FACULTY OF COMPARATIVE MEDICINE AND VETERINARY SCIENCE.—This is the title of a long article in the *Montreal Gazette*, giving notice of a change in the constitutions of McGill University and the Montreal Veterinary College, by which these institutions become united into a single organization which shall combine and consolidate the resources and advantages of both of the uniting schools. Whether this change will result in a gain or loss to the profession is a question which time alone can ultimately determine. Prof. McEachran has worked hard for years, and had succeeded handsomely in establishing a veterinary school in Canada, and if the classes in attendance did not count their students by hundreds, his graduates were, nevertheless, well reputed, and enjoyed the confidence and received the unhesitating recognition of all the veterinary or-

ganizations in the country. But though the Montreal Veterinary College is gone, it is succeeded by a new faculty at the McGill, which, moreover, covers an enlarged field of instruction, as its title indicates, of a "faculty of comparative medicine and of veterinary science." We congratulate Professor McEachran upon this change, if it is to result in a benefit to the profession, but we cannot part with him as the learned principal of the school of which he was the founder, without an expression of our profound regret.

PAQUIN VACCINE LABORATORY.—Those of our readers who have followed and appreciated the course of the REVIEW in bringing forward for examination and discussion the various subjects of importance and interest to the profession which are suggestively involved in the current reports of the progress made in the study of comparative medicine and pathological physiology, will remember our repeated calls upon the profession for the qualified men who should undertake to discharge the duties which were gradually and still are imposing themselves upon the veterinarians throughout the country.

Satisfied as we have been for years of the great value of Pasteur's discoveries, and of the immense benefits which might be derived from their proper improvement, and the incalculable advantage which the veterinarian and bio-pathologist might confer on the profession through their application to the animals entrusted to their care, we have again and again pleaded for the introduction of a systematic and general practice of preventive inoculation in the treatment of the contagious diseases of our animal patients. We have urged our brethren to enter upon a course of experiments in that direction, and we have imported and offered to furnish our colleagues gratuitously with a supply of matter for inoculation, and we have at last earnestly asked of our friends who have charge of large experimental laboratories, to work, prepare, test and furnish the profession with the viruses and cultures which are now *known, beyond possible and reasonable doubt*, to protect animals against the dangers of infection and contagion. To this day, however, our exertions have re-

mained almost entirely fruitless. It is true that Dr. Faust, of Poughkeepsie, made a few experiments with some virus of anthrax which we had obtained for him from the laboratory of Cornevin, at Lyons, and it is also true that Dr. E. Salmon and Professor Law had also, we believe, worked in that direction, but without any public announcement of results. It would undoubtedly be a great satisfaction for all veterinarians to know that at least one establishment has been formed and a laboratory established where matter can be obtained for at least one disease—anthrax, for example, under both of its forms. The Paquin Vaccine Laboratory of Columbia, Mo., is now offering these vaccines. We are not prepared to decide upon their quality, but when it is considered that Dr. P. Paquin is at the head of the work, we are justified by his past professional life in believing that he would not take the stand he assumes in his advertisement without having taken all strictly necessary precautions, in the form of laboratory tests and experiments, and the practical applications upon which must depend the entire value of the products in question, and the sole guarantee of their success when properly used. Failures in the use of vaccines may mean failures of the manipulations or methods of the laboratory, but they cannot disprove the efficacy of the principle of prophylaxy. It has been tested too extensively in Europe for any doubt on the subject, and we cannot fail to succeed here under proper conditions. Will not others imitate Dr. Paquin?

DIARRHŒAS OR SCOURS.—In a former number we printed a long and interesting article on the subject of the diarrhœa or scouring of nursing animals, such as colts, calves and lambs, which we trust has proved of great interest and value to our readers. Though not a veterinarian, Dr. G. A. Stockwell, the author, is a comparative pathologist (a correct designation, in our opinion, for a true veterinary scientist), and the manner in which, in a general point of view, the subject of his article is treated, furnishes good evidence that he has carefully observed the peculiarities pertaining to the disease in question. The treatment which he recommends, whether in respect to the hygienic measures or to the therapeutic

means, are full of wise suggestion, and the remarks which he offers relating to the use of digestive preparations, or of stomachic compounds, and principally of pepsins, should not be ignored by those who may be called to treat youngsters affected by diarrhœa. The preparations of pepsine which are offered for sale by the house of Parke, Davis & Co., of Detroit, seem to possess all the qualities required by the indications, and from statements we have already received of the good results obtained by the use of the *concentrated glycerole*, and of the *elixir*, we believe that we have done well in bringing the subject before our readers. The reports which we have now at hand are few, but are very satisfactory, and we would be pleased to hear further from those who may have opportunities to try them. Though these preparations have not yet entered very largely into veterinary practice, having been principally confined to the domain of human medicine, the comparative pathologist cannot ignore them, and is in duty bound to the profession to try for himself whether their use is not followed by adequate benefit in his own sphere of observation and knowledge.

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## ORIGINAL ARTICLES.

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### HOW DO MICRO-ORGANISMS CAUSE DISEASE?

Based upon an address by Ludwig Brieger to the Sixty-second Versammlung Deutscher Naturforscher u Aertzte.

BY WM. S. GOTTHEIL, M.D., Professor of Surgical Pathology to the American Veterinary College.

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The latter half of the nineteenth century will be known in medical annals as the era of etiological discovery. We have, indeed, of late years grown so accustomed to results which in former times would have been considered the medical wonder of the age, that they pass by us almost without our knowledge, and certainly without our appreciation of their importance. If we reflect that but a few years ago the rationale and exact cause of an immense class of diseases, in-

cluding some of the most important and common that affect man and animals, was absolutely unknown to us ; that to-day we possess very definite and accurate information on these points in the majority of them ; that month by month, and almost day by day, our knowledge concerning them becomes more and more extensive, more and more precise, we shall, perhaps, appreciate a little more correctly the immense advances that scientific medicine has made in the last three decenniums.

Starting from the broad and firm basis of experimental physiology and pathological anatomy, we may to-day divide all known maladies into the following four groups :

1. Diseases of traumatic origin.
2. Diseases of infection.
3. Diseases due to nutritive changes.
4. Neuroses.

Of course there is no essential difference between the origin of classes one and two. Micro-organic infection is a traumatism of the cells. But it is convenient to separate those affections that are due to rough macroscopic influences from those due to the less visible and secret injuries inflicted by the microbes on the cells. Classes three and four are those about whose rationale we know least ; but they are also those that suffer most from the discoveries that are made. The number of neuroses and nutritive diseases diminishes continually, as disease after disease is found to belong among the infectious. As far as the neuroses are concerned, it is well understood that the class is only a provisional one. The change may be so minute as to elude our grasp for a long time to come, but we may venture to affirm that there probably is an actual change of tissue in every case, and when there is such a change there must also be a cause for it.

Three names stand pre-eminent in the history of our knowledge of the infectious diseases. The first is that of the man who discovered the specific microbes that cause the fermentations, alcoholic, acetic, lactic, by means of which alone the life of the higher animals becomes a possibility.—*Pasteur*. The second is that of *Lister*, who adapted and utilized these

discoveries, and by this means placed practical surgery in a position of scientific accuracy undreamed of in former times. And the third is that of *Koch*, whose systematic methods and far-reaching discoveries opened the paths of limitless improvement which practical medicine has but just begun to tread.

Wherever we turn in nature, the activity of the bacteria is apparent. All the fermentations, all the putrefactions, most of the processes by which insoluble and non-assimilable material is prepared for the use of the higher bodies, many pathological processes—all are due to microbic life. The microbes live upon matter, and secrete or excrete, as you will see from the various chemical substances that form the essence of these changes. The *chemical action of the micro-organisms* is the key that will unlock for us many of the most secret processes of nature.

The putrefactions were first thoroughly studied. A multitude of bodies, mostly poisonous, indol, skatol, cresol, carbolic acid, were discovered to be formed by the successive broods of microbes that lived upon the putrefying material, and upon each other. They were called ptomaines or toxins. Soon these same products, these same organisms, were found in the human alimentary canal, and the whole intestine was found to be simply an immense centre of putrefactive change.

Nevertheless, under normal conditions, these organisms and the poisons they produce do no harm. The chemical substances unite with the sulphur compounds, and become harmless. If, however, as in hyaemia, scarlatina, diphtheria, intestinal diseases, etc., the normal activity of the tissues is impaired, the putrefactive products are not neutralized, and they appear unchanged in the excreta.

From the putrefying flesh of men, horses and cattle a long list of poisonous ptomaines has been obtained. Neuridin, cadaverin, putrescin, midatoxin, typhotoxin, neurin and methyl-guanidin are some of them. They are all bacterial products. Thus the harmless creation, formed as a proximate principle in the flesh of all mammals, becomes, through the oxidizing power of the bacteria, methyl-guanidin, a violent poison that kills with convulsions of all the muscles.

Fishes, when they have begun to putrefy, exhibit a long list of poisons, some extremely violent, and putrefying albumen, cheese, and many other things show similar products.

It is, therefore, not surprising that we read every now and again in the journals of cases of food poisoning, whole communities being sometimes affected. Thus four years ago there was a general poisoning of the population in Wilhelmshafen in Germany, which was traced to the use of a certain species of mussel which abounded in the harbor of that port. It is needless here to recount the symptoms of the poisoning that ensued, and which seemed to affect the nervous centres and especially the *Leuconium* and the motor tract. Multitudes of the patients died, many of them after eating but five or six mussels. It was soon found that the injection of a decoction of these mussels under the skins of animals killed them with the same symptoms. Finally, a poison, found only in these mussels at that time and called *mytilotoxin*, was isolated.

In this same way all dead animal tissues are used by the successive broods and crops of microbes, who split up the complex albuminous molecules into simpler and even simpler products, until finally, in the comparatively non-complex combinations of oxygen, hydrogen and carbon, they are in such shape that they can be used by both the animal and vegetable world, and can again begin their cyclic changes. Of especial interest to us is the fact that these ptomaines and toxins are extremely similar in chemical reactions to the vegetable alkaloids, a fact of the greatest importance in medical jurisprudence.

Nor are the pathogenic bacteria behind their putrefactive brethren in the production of these poisonous chemicals. The cocci of suppuration, *staphylococcus pyogenes aureus* and *streptococcus pyogenes*, cause the well-known blood-poisoning, pyaemia and septicæmia, by the products of their life action. Ammonia, trimethylami, phlogosin and others not yet studied, are known to be formed.

The typhus bacillus produces the specific typhotoxin, which kills by paralysis of the muscles, and is accompanied by salivation and gastritis.

The cholera bacillus produces penta-methyldiamin, tetra-methyldiamin, methyl-guanidin, and other poisons. These cause the profuse diarrhœas, the uncoagulability of the blood, the alidity and muscular spasms, the peculiar odor of the dejecta and of the breath.

The microbic cause of tetanus is proven to be present everywhere in nature. *Tetanin* has been gotten pure from the newly amputated arm of a tetanic patient, and is one of the four poisons that the bacillus produces and that cause the dreadful symptoms of that malady.

The *anthrax bacillus* produces ammonia and the poison methyl-guanidin.

But besides these admittedly bacterial diseases, there are others more mysterious and of unknown origin. They are caused by some chemisen of the body, of the nature of which we are ignorant. In some of them products have been found that point immediately to microbic activity; organic poisons that are doubtless due to the life-action of some yet unknown organism. Brieger has studied them in cystinurea and other nutritive diseases, and also in leukæmia and the blood changes.

Thus the action of the micro-organisms on the body is due to the poisons they produce, and the question of infection by any given kind depends on the susceptibility of the organisms that they attack. This susceptibility is greatly diminished by one dose of the poison, and hence the success of the various vaccine experiments that have been made.

But so long as we vaccinate with the organism or virus itself, or modifications of it, our work must necessarily be unscientific and inexact. Along with the specific poison, the ptomaines or toxine, we introduce into the body an unknown number of others, and also the micro-organisms themselves. We need only inoculate the one poison against whose more virulent attack in larger and more concentrated dose we desire to protect the organism. This we shall be able to do when we can isolate and prepare in chemical purity the ptomaines and the toxines. Then will medicine—the science—begin to purge itself of the old and merited reproach of empiricism.

## COMPLICATED CASE OF PNEUMONIA AND GLANDERS.

BY H. A. HEISNER.

A paper read before the Veterinary Society of the University of Pennsylvania.

*Mr. President and Gentlemen :*

I beg leave to occupy a few moments of your valuable time to call attention to a very peculiar case I was called upon to treat the past summer at my home in Baltimore. I think it a very interesting case, if not an instructive one, as I have never seen nor heard of a similar one before.

The patient in question was a bay gelding eight years old, well bred and used exclusively for pleasure, as he was a fast roadster. I was asked by a friend of the owner to examine the horse and treat him if I could do so, and in company with this gentleman I called at the stable, where we were met by the owner, who stated that he had sent his horse out to pasture; all the history I could obtain was that during the previous four weeks the animal had been treated by three quacks or horse doctors.

What the first one treated him for I do not know. The latter two, however, treated the animal for kindey trouble, as I was told they diagnosed it, and it was upon the advice of the last one who treated the animal previous to my first visit that the owner sent the horse into the country, this quack having told him that this would be all that was necessary to perfect a cure. Such is all the history I could glean from the owner. However, I went out to see the horse, and after carefully noting the posture assumed by the animal, who was standing back in his stall with the head extended on end of halter strap, I proceeded to make an examination of the animal and noticed the following symptoms, which at once convinced me that the quacks had made a serious error in their diagnosis.

Symptoms were: Animal dejected; visible mucous membranes congested: temperature  $103\frac{4}{5}^{\circ}$  F.; respirations accelerated, pulse quickened and weak; on auscultation heard crepitant rales and on percussion elicited dullness over both

lungs; on noticing nostrils a slight discharge of a rusty sputa character was observed, which, however, disappeared in a few days.

These symptoms I deemed sufficient to make a diagnosis of pneumonia, and I treated the animal accordingly. The following was my treatment: First, I bled from the jugularis, taking about eight quarts of blood, as the horse was in tolerably good condition notwithstanding the fact that the character of the pulse contra-indicated depleting. Next I applied sinapism over sides of chest and belly, gave spiritus aetheris nitrosi  $\mathfrak{z}$ i in each bucket of water, used the salts of potassium and for weak heart administered F. E. digitalis in drachm doses, gave stimulents; small doses of sulphate of soda were given occasionally to stimulate the digestive tract and prevent constipation; gave carrots, apples and etcetera, to coax the animal to eat.

To this treatment, including good hygienic surroundings, the animal responded, and to all intents made a good recovery. But when allowed to run at grass with other horses, it was noticed that he would not eat grass, neither would he stay with the other animals, but would wander off to a secluded spot where he would make a path about thirty feet in length and pace to and fro the entire day, never deviating from this path. He never walked in a circle, neither in the stable where he had a box stall, nor in the field. Upon hearing of this I arrived at the conclusion that there was a brain lesion existing which caused this peculiar wandering, so I gave the horse a purge in form of an aloes bolus and followed this up with the mild chloride of mercury and bicarbonate of soda for about two weeks, at the end of which time I found a decided change for the better. He would play, so to speak, with the other horses, his wanderings ceased, he began to eat grass and when given an apple would follow you around, which is something he would not do before. I ordered this treatment to be continued for another week and left the case as recovered.

One week following being Sunday, the owner saw the horse and was so pleased with his condition that he said he

would get the animal home and begin driving him in a few weeks. I mention this as evidence that there did not exist at this time any sign of the disease I am about to speak of. (This was four days prior to its development).

On the Wednesday following, the farmer noticed a discharge issuing from the nostrils of the horse, and being a sensible man he isolated the animal and sent word to the owner that his horse had a cold. The owner sent me word to go and see the horse again, which I did at once, and imagine my surprise when I found the horse suffering from a most beautiful case of acute glanders, presenting the following symptoms :

Discharge from both nostrils which looked like the white of an egg; there was an occasional epistaxis, which caused the discharge to become mixed with blood; upon examining the septum nasi a number of tubercles of various sizes and presenting a dirty oily appearance, could be seen. The sub-maxillary lymphatic glands were high up in the inter-maxillary space and were firm and lobulated; three farcy buds were present and these on the posterior limbs. It is needless for me to say that I did not attempt to treat this, the third disease the horse had had during a period of six weeks.

As a means of precaution against the spreading of the disease among the other animals, I had the animal removed to a wood near by without crossing any highway, and where no animals are allowed to run. I then examined the other horses on the farm, I think some sixty (60) in number, and found none affected, and so far as I have learned not a single horse has since developed the disease.

I then reported the disease to the Bureau of Animal Industry, and one of its officers went out and examined the horse, and I am pleased to say he confirmed my diagnosis of acute glanders. He condemned the animal and forbid his removal under any circumstances until the State veterinarian could appraise and destroy him. This gentleman, however, did not see him, as he died in a few days and was buried, and I, therefore, did not have the opportunity of making a post mortem examination.

Now, gentlemen, if my subject has not become monotonous, I would like to ask a few questions, but before doing so, I will say that this horse was not known to have come in contact with any animal diseased with glanders.

The questions are:

1. Was the glanders here a sequella of the previous trouble? I have never heard of its being.
2. Was it of spontaneous origin?
3. Was the pneumonia caused by the formation of the tubercles which we invariably find in the lungs of a glandered horse.
4. Was the germ in the system and did the debility produced by the previous illness act as an exciting cause, and cause the development of the glanders? This latter I think very plausible, as an explanation for the sudden development of the disease.

However, I hope you will all give your opinion as to the cause of the development of the glanders in this particular case. Let us hear from you, gentlemen, if not to-night at some future meeting of our society.

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## BOVINE TUBERCULOSIS.

A Paper read at a Meeting of the New Jersey State Veterinary Society,  
by E. L. LOBLEIN, D.V.S.

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*Gentlemen:*

For the entertainment and I hope benefit of the society, I have undertaken to write on a subject that I am illy able to cope with, but as I consider the study of tuberculosis of paramount importance to the veterinarian, I thought we might air our opinions and experience with benefit to all. My reasons for considering it so important are these: First and chiefly. Much of the milk and meat from such diseased cattle are consumed for food daily, and although not in a position to say positively that the flesh and milk from tuberculous cattle is dangerous to use, yet I think many cases of tuberculosis in human beings could be attributed to consumption of such food. Especially do I think this possible in little chil-

dren being fed the milk from a cow suffering from this disease. Here I will remark that Jersey cows are more subject to tubercle than other and commoner breeds of cattle, and how well we all know that in the suburbs of large cities and in small cities we find one cow kept to supply milk for the children of a family and this one cow in nine cases out of ten is a Jersey cow. Many medical practitioners have often told that they meet with true cases of tuberculosis in children where the most careful research failed to show that there had been any tuberculosis in that family for generations back, consequently there could be no hereditary taint. Could not many of these cases be caused by the milk of tubercular cattle? My experience is that in the majority of cattle suffering from this disease we find tubercles in the udder in various stages of degeneration and sometimes leading directly into the milk ducts. I call to memory one case of a cow that was used to feed calves, as she had been coughing some time and the owner, being a very scrupulous man about healthy food, would not use the milk for human consumption. Two heifers, five and six months old, both calves from healthy cows, who had been fed from this cow sickened and died with tubercular dysentery; and after I found out their history I made a careful examination of the cow and pronounced her a case of tuberculosis. I watched this cow closely and about six months after, as she was nearly dead, the owner consented to kill her and allow me to make a post mortem, which revealed a beautiful case of tuberculosis with a tubercle in the udder in a state of cheesy degeneration. I felt positive then that those calves had contracted the disease from the milk of that cow. For the same reason I contend that the milk could produce the same disease in children, and whenever I have reason to believe a cow is suffering from this disease I advise the owner, in the strongest terms possible, not to use the milk from said animal in his family. True, such advice will often bring adverse criticism down on us through ignorance, but such is often the case where one is doing what he considers his duty, and as we should be sanitarians in the strictest sense of the word, we should never miss an opportunity where contagious diseases

of cattle or any animals are menacing to human health, to show that we are such, and as such the public will be compelled to respect our calling.

Now arises a question. If the flesh of such animals is unfit for food, how absolutely necessary becomes the inspection of all meat; not the sort of inspection I have heard advocated by some, for the inspector simply to go around to each butcher shop and pronounce the meat good or bad, but that every animal should be inspected when slaughtered. Of course I do not want to impress any one with the belief that I entertain an opinion that those cases where an animal in otherwise good condition has a tubercle or cyst in some part of the body or organs, is unfit for food, but there are many cattle slaughtered in an advanced stage of tuberculosis and find their way to the sausage makers. This I say from personal knowledge, as I know of a number of instances where I have advised the owner to destroy a cow and get her out of the way, and in a few days she has been taken to the butcher's. Just here we might speak of the great number of two, three and four-day-old calves, known as bob veal, that are consumed all the time and are the direct cause of many cases of cholera morbus, particularly during the summer season—but my enthusiasm over the inspection of meat is taking me from my subject.

In regard to the propagation of tuberculosis there are many and various opinions set forth in our text books, in studying over the different ways of propagation of this disease. We also believe in its hereditary predisposition. We also believe in its contagiousness, and still I believe that from chronic bronchitis genuine tuberculosis may be developed, but I believe the disease could be lessened by more judicious breeding of cattle, and the farmer or stock-raiser should be advised never to breed a cow that is not in apparently perfect health, as this is the only way to advise him, for if he waited until he recognized the disease, the trouble could not be averted in this way. I can tell one instance where the disease has been developed in three generations in a very few years, showing how the disease could be increased in that way, and cows suffering from tuberculosis have a great tendency to breed, and

I believe the same is the case with all animals suffering with this disease. Locality seems to exert a strong influence in the rapid development of tuberculosis; low and damp land seeming to increase the disease very rapidly. The same may be said of all lung diseases. I will narrate a case which to me was very interesting: While inspecting cattle under the employ of the Government, I was called to examine some cattle on a farm where there had previously been contagious pleuropneumonia; one year previous, on examination, found one cow quite sick, but could not make a differential diagnosis between pleuro-pneumonia and tuberculosis. Left to call again in a few days, thinking that I could tell more positively by that time. The next week I was surprised to find this animal much better, but another cow was then pining away very rapidly and coughing a great deal; on examination I diagnosed this a case of tuberculosis, but not feeling positive, I requested the chief inspector to visit this herd and we made a post mortem on one of these cows, the second one taken with the disease, and found the most perfectly developed case of tuberculosis it has ever been my good luck to see, the pleura and anterior face of the diaphragm being completely covered with miliary tubercles and the lungs in the same condition. These cases occurred in the fall of '88, and before the spring of '89 thirteen out of a herd of eighteen had succumbed to tuberculosis, where all had been healthy with the exception of two first mentioned that were taken sick in the fall. The pasture and stables in which these cattle were kept were on low, marshy land. This is an evidence of the rapid progress the disease can make in a herd under such favorable circumstances.

Gentlemen, you will observe that I have not entered into the minute physiological study of the disease, as I thought that would exhaust too much time without bringing forth the argument that would be of the most practical benefit to us. With regard to treatment, I never would advise any in cattle, as, to say the least, it would give unsatisfactory results and be a useless expense.

## THE CONTROL OF SEX IN BREEDING.\*

BY J. P. KLENCH, V.S.

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I read with pleasure the interesting and also curious article of the *North British Agriculturist* published in your edition of May 11th, and fully agree with the author when he says that the most of the theories propounded on the subject are ridiculous in the highest degree. I will even say that they all, without exception, are very absurd and can pass off easier for stable yarns than for serious theories.

It must be admitted that if there is a law governing the sex in breeding, it must equally apply to all species of animals, and even to those of the lowest class.

Physiologists have admitted many years ago, that there was no law controlling the sex in the offspring, but proved that the sex depends solely upon the actual preponderance of either male or female at the time of copulation; that the pre-eminence of one nature over another is established by health, age, vigor, energy of constitution and natural development. Any male with such advantage, will always reproduce not only his sex, but also his strength, speed, endurance, form and temper; which fact is well known to all breeders of fast horses throughout the United States.

The real mystery of the generative act has never been fully discovered in spite of the most thorough observation of the physiologists. It is well known that fecundation, in all species of animals, is accomplished by the intimate union of the male spermatozoa to the germ of the female; but it was so far entirely impossible to find out how their union is established, in fact how these animalcules copulate. Science could not go further and the final act of fecundation is still a mystery.

This article recalls to my memory a similar discussion which took place in the Academie des Sciences of Paris, France, about thirty years ago, when an old, venerable gen-

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\*From the Breeder and Sportsman.

tleman earnestly advised his medical confreres to investigate the mysteries of nature upon themselves and their families, adding, however, that it was a very delicate matter for a man to expose in public the secrets of married life. But as he was advanced in years, he would not refrain from communicating his personal experience on that question. Imbued with the truth of the above physiological law, he expressed to his educated wife his desire to investigate this matter for the benefit of science, and succeeded in obtaining her consent. The result was as he wished—two sons and a daughter.

This same principle was taken up immediately by scientific agriculturists, and a few years later, in 1861 or 1862, I read in French agricultural papers, several reports of successful experiments made by an aristocratic breeder of fine cattle. Wishing to obtain a bull calf from a cow that was a great producer of rich, creamy milk, he tied a common bull with that cow for several days to keep her sexual organs permanently excited, and when he thought her nature sufficiently weakened he gave her the service of a strong, vigorous bull, and obtained a bull calf. For the following years he succeeded in raising, at will, heifers from the same cow, by putting her to the bull on the very first day she come in heat. Several other breeders confirmed the truth of this principle by proceeding in the same manner with horses as well as cattle and swine.

I have never since that time read any further details upon that question, but can draw from daily life sufficient evidence to prove the same facts.

Many instances are found where a man of old age and weak constitution marries a young, robust wife, and the family will count all daughters, or more daughters than sons. All sheep raisers know well that adult ewes in good health and condition will bring more ewe lambs than bucks, while a vigorous adult ram, turned out with a small number of young ewes or old, weak, sickly sheep, will produce more bucks than females.

I know of an old slut, covered by a young large St. Ber-

nard dog, that gave birth to six male pups, all resembling their sire in color and size.

In some years we hear that more fillies are born than horse colts, while in others their numbers are about even. A close investigation of the breeding books of our great establishments might give some very interesting information in regard to that matter. Mr. S. Heplar, of the Laymo Ranch near Santa Rosa, raised last year, from nine mares, six horse colts; while this year the same nine mares, bred to the same stallion, brought one horse colt to eight fillies, and he never could see any difference in the condition of his horse. Nature always has, and forever will, perform acts that cannot be explained by the most acute human intellect, and whenever the above physiological principle does not find application, all efforts to obtain further light about the mysterious ways of nature will be made in vain.

The article of the *North British Agriculturist* speaks very highly of the only reasonable theory so far, promulgated by a German and American physician, namely, that the right testis and the right ovary produce male sperm and male germ, while the organs of the left side produce the female sex, and that the seed of one side would not impregnate that of the other side. The experiments those gentlemen have made to test the accuracy of that theory have given them results that they declare are in accordance with that theory. In evidence they report the following case: There have been for several years among the horses of a Danish regiment, in spite of all endeavors, some pregnant steeds after the time of pasture. It was known that this had been the case several times at the same season, and the watch was particularly active, no strange horse having been admitted to the pasture grounds. At last they found that among the horses of the regiment there was an old stallion whose right testicle had been taken out, and all the foals generated by him were fillies." In all certainty that old horse was a ridgling whose left testicle was located in the abdomen, and consequently was not a potent breeder, and unable to cope in vigor and constitutional strength with healthy mares in full possession of complete

sexual organs. These gentlemen were most certainly mistaken; besides, I can refute that theory by several reliable, existing facts. Dr. Sheares, of Santa Rosa, who has served as physician in the War of the Rebellion, knows of a soldier who lost the right testicle by a bullet shot to have raised five children, of which three are boys. I know in Santa Rosa a man of middle age and good, robust health, who lost his right testicle while a young man, married, and with but the left testicle glories in the possession of three children, all three boys. Almost any physician throughout the country could report some cases to refute this irrational theory. I can merely wonder how the world could exist thousands of years without making a good, practical use of this theory if it was true.

The owners of large cattle ranches, for instance, who wish to stop the too rapid increase of stock, instead of spaying the heifers in full, would only remove the left ovary from a certain number of cows, in order to obtain only bull calves that would, in time, make steers for the market.

It is besides a very difficult task, or rather an impossibility to support this lateral sex theory by arguments drawn from anatomy and physiology. One can hardly believe that nature, which intended to facilitate the reproduction of every species of animals it has created, would interpose such difficulties to their natural increase, by subjecting the same to a mere hazard. And indeed, the sperm of the male must be carried to either one of the two horns of the womb, left or right, in order to meet the germ coming from the ovary. But suppose that the sperm of the right testis would come in contact with the ovum of the left ovary, there would not be pregnancy according to that theory, and the purposes of nature would be foiled, which is unnatural. The left horn would necessarily be destined to develop only a female foetus, and the right horn the male foetus; but practice shows that bull calves are found in the left horn of the cow's womb, and filly colts in the right horn of the mare's womb. Nor has anybody ever observed that in mulipares like the swine and canine species, the foetuses were separated in the womb

according to sex? The two sexes are always indifferently developed in the same horn of the womb, where fecundation took place. We need only to mention that sows, bitches, cats, goats and sheep will give birth to several young ones, from two to ten and twelve, of various sexes, to demonstrate that there cannot be the least foundation in that lateral sex theory. Even the twins of our human species will bring testimony against its rationality.

It must be again admitted that this theory, if true, would find application to all animals. But in fowls, birds, etc., there is only one ovary and that is the left one, the right ovary becoming atrophied at an early age in nearly all species of fowls. This left ovary constitutes a large organ of the form of a grape, composed of many ovaries in different periods of development, the young ones being small and whitish, while the old ones are large and yellow and constitute the yellow part of the egg which is completed as it progresses towards the cloacum. Then the left ovary in fowls produces our fighting cocks and crowing roosters as a daily evidence against this lateral sex theory.

Another instance is found in the rabbit, where the body of the womb is absent, and the two horns open in the vagina. It would be ridiculous to suppose that Mr. Jackrabbit knows how and when to draw on the right testicle and deposit the seed in the right horn so as not to commit *error naturæ* to the disadvantage of the rabbit species. But the disastrous increase of rabbits in the Fresno and Kern countries is a *prima facie* evidence that the jackrabbit is not guilty of any mistakes of that nature.

The mode of fecundation of fish spawn would be another instance against that theory, for in this case the fecundation is accomplished without the concours of either male or female. For the spawn is floating in the water and there impregnated at hazard by the floating sperm of the male fish. The impregnation is mere accident.

## REPORTS OF CASES.

*"Careful observation makes a skillful practitioner, but his skill dies with him. By recording his observations he adds to the knowledge of his profession, and assists by his facts in building up the solid edifice of pathological science."*—VETERINARY RECORD.

## AMERICAN VETERINARY COLLEGE—HOSPITAL DEP'T.

## INVERSION OF THE BLADDER.

BY W. G. COATES, M.D., D.V.S., Assistant Veterinary Surgeon.

The following case came under my observation, and is of interest because of its rareness.

I have sought veterinary literature relative to inversion of the bladder, and find it a very rare affection, occasionally taking place previous to parturition or after delivery, but have failed to discover any article on the subject where it has not been a complication in the parturient state.

On August 14, 1889, a black mare, nine years of age, medium height, in good bodily condition and used for hacking purposes, was admitted to the Hospital Department of the American Veterinary College with the following history: had been in possession of present owner three years, always in apparent good health and never noticed anything abnormal except an occasional desire to micturate large quantities of urine of a pale color. Early in the morning of the day in question, the owner on entering the stable, noticed the mare elevating and switching her tail and making attempts to urinate. Not paying particular attention to this, gave her a feed of oats and returned again at noon to find her acting uneasily, as if with colicky pains. On the floor behind her was a little urine streaked with blood, which alarmed him considerably, and he sent for a veterinarian in the vicinity, who came immediately and discovered a reddish looking mass protruding from the vulva, which he thought was a prolapsus of the uterus. After making several unsuccessful attempts to reduce the tumor, and knowing it a serious and troublesome case, advised the owner to send the animal to the hospital, where the facilities were much better for treating a case in her condition than in the owner's stable.

On admission, the body was partially covered with sweat, slight colicky pains, pawing occasionally and making frequent attempts to lie down, elevating and switching the tail, frequent and violent straining, with legs widely stretched apart, arching of back and using extraordinary efforts of the abdominal muscles in trying to get rid of some foreign body from the vagina, anxious countenance, pulse accelerated and respiration jerky in character. At each effort of tenesmus, the vulva would dilate and a bright rose colored looking tumor of globular shape would protrude from the vulva, and at the same time a few masses of feces were expelled from the rectum with a considerable amount of flatus. Thinking it a case of prolapsus of the uterus, and having her properly secured in the standing position, made a vaginal examination, and to my surprise found a complete inversion of the bladder, which was easily reduced on account of an excessive dilatation of the meatus urinarius, which was about two inches in diameter, soft and flabby to the touch. The mass was no sooner reduced than it was expelled again, from the constant and violent muscular action; five or six times it was replaced and as fast returned again. At last I determined to hold it in place with my hand in the interior of the bladder, acting as a pessary, but the efforts on the part of the mare to evert the bladder and resist my hand by her persistent straining, were so violent that a metallic female catheter was introduced into the bladder and held in position by Dr. Hühne, one of the staff of the hospital, and a solution of one ounce each of tincture of opium and belladonna was poured into the bladder through the catheter. In about five minutes the tenesmus lessened, but on withdrawing the hand, the whole contents of the bladder was violently expelled, mixed with a small amount of blood, and the bladder itself partially inverted. The same method of reduction was employed again and the same amount of opium and belladonna introduced, which resulted in reducing the irritation. In the meantime ten drachms of chloral hydrate in pill form was given, which had its effects in twenty minutes, and all efforts at expulsion ceased.

I was about preparing some sort of a pessary to strap in

place, but seeing the chloral have such control over the voluntary efforts of the animal to persistently strain, I thought it better to leave well enough alone and administered eight drachms of chloral, and in half an hour she was in a profound sleep lasting four hours, and remained drowsy as long more. After the effects of the chloral passed away, there was a tendency to tenesmus and she was given an injection of opium and belladonna as before.

The following morning she was apparently quiet, with an occasional elevation of the tail and passing a considerable amount of flatus from the rectum and expelling small quantities of urine. She was now placed under local anodyne as required, fed on soft food, and on August 22d discharged apparently all right, the meatus urinarius having contracted to about half an inch in diameter. The bladder was considerably hardened and indurated, and the mucous membrane had a sort of a nodular feel, but being afraid that the same occurrence might take place again I deferred making a further examination.

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#### JABOT—OBSTRUCTION OF THE ŒSOPHAGUS—OPERATION.

BY R. R. MORRISON, D.V.S., House Surgeon.

This animal was a sorrel gelding, six years of age, recently purchased, with a guarantee of soundness at the time of purchase. Five days after his examination he was fed with carrots, which he ate greedily, and the next morning was found coughing up large quantities of saliva. He then presented an enlargement about as large as one's hand, situated at the lower part of the neck, on the left side. The tumor was soft and puffy, somewhat movable, and when manipulated caused the animal to have spasms of the neck, followed by copious discharges of saliva and coughing. At that time the temperature was  $102^{\circ}$ ; pulse 54 and somewhat weak; respiration 36, with a slight sweating on the left side of the head and neck, the right side being quite cold. The diagnosis was made of a jabot, caused by a piece of carrot lodged in the Œsophagus, and causing the obstruction by its dilatation. Simple means,

such as the administration of oil and glycerine, proved of no benefit, and the owner was notified of the critical condition of the patient and of the necessity for surgical interference, viz., the opening of the œsophagus, to displace the foreign body, which was lodged in the thoracic portion of that organ, and of the division and stitching of that organ for that purpose.

Having obtained his consent to the operation, two drachms of solution of cocaine, ten per cent., were injected around the enlargement. The animal standing up, an incision was made through the cut, and continued down to the œsophagus. The blood vessels, carotid and œsophagus being isolated and carefully pushed aside, the œsophagus itself was separated from the surrounding cellular tissue, and a piece of tape put under it, allowing it to be gently raised from the depth of the wound and its coats carefully incised. At that moment the sac was emptied of its contents, consisting of masticated food and saliva, and then a probang inserted into the canal. Some eighteen inches in the thorax, from the cervical incision, the instrument came in contact with the foreign body, which to be dislodged and pushed in the stomach required a certain amount of force. A small portion of the edges of the œsophageal incision was removed, and the coats of the organs brought together with fine closed sutures of carbolized silk. The outside edges of the incision were held together with a pin suture, the wound dressed antiseptically as well as possible, and the animal put on liquid nourishing diet.

The following day the temperature of the patient was  $102\frac{3}{5}^{\circ}$ , pulse 60, respiration 24. He had drank a pail of alcoholized water, the wound looked well and was dressed as before. On the third day the temperature rose to  $105\frac{2}{5}^{\circ}$ , the pulse remaining at 60, weak, but regular, and the respiration accelerated to 40. It was feared that the stitches had not closed the wound very closely, as a portion of the liquid he had taken seemed to escape. Nutritive enemata were given during the day, and the wound dressed as usual. On the fourth day the thermometer registered  $105^{\circ}$ , the pulse had gone up to 80, respiration 40. The expression was anxious

and the body covered with sweat in places. The wound was very offensive, and some portions of cellular tissue were sloughing away, though granulations of a healthy nature were found at the bottom of the wound. A diet of milk and eggs was ordered and drank by the patient, but very little escaping through the wound. On the sixth day the temperature was  $106^{\circ}$ , pulse 120, respiration 54. The extremities were cold and there was profuse sweating, with a watery, offensive discharge from the bowels, and shortly the animal laid down and died, without a struggle.

At the post mortem the lungs and heart were found in a healthy condition. The stomach contained a small quantity of fluid and a few grains of undigested oats, and the intestines a small quantity of watery matter. On removing the œsophagus, only one of the stitches was found to have held. The edges of both the muscular and mucous coats were gangrenous, and a number of small abscesses were found around the seat of the operation, extending into the thoracic cavity. The mucous membrane of the œsophagus, a short distance from the diaphragm, was ulcerated in several places, at the place where the foreign body had been stopped and pushed off by the probang.

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## SURGICAL PATHOLOGY.

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### NOTES ON THE PRESENCE OF THE RABID VIRUS IN NERVES.

By E. ROUX.

The author, continuing his experiments on the effects of the inoculation of the various nerves of animals that have died from rabies, without giving final conclusions, records the following facts: Two rabbits, inoculated with the produce of the crushing in water of nerves of the right and left axilla of a subject bitten on the left thumb, died, one, the thirty-fifth, the other on the thirty-sixth day after inoculation. A third rabbit, inoculated with the bulb, died in fifteen days; a fourth rabbit, inoculated with the left radial nerve, was well ten months after the inoculation. These experiments seem to prove that the propagation of the rabid virus took place from

the center to the periphery. Four other rabbits inoculated, two with the nerves of the left, and two with those of the right axilla of a subject bitten on the right hand, survived the inoculation. A rabbit inoculated with the cubital nerve from a subject bitten on the right hand, became rabid in fifty days. Another, inoculated with the right median nerve, became sick in nineteen days. Two rabbits, inoculated with the left median and cubital nerves, survived more than ten months; and another, inoculated with the bulb, became rabid in fourteen days. In a fourth case the results were analogous, except that the inoculation of a rabbit with the radial nerve of the bitten side was ineffective. In this same experiment, a rabbit inoculated with the nervous mass of the axilla of the bitten side became rabid after three and half months; in this case the propagation seemed to have taken place along the cubital nerve from the periphery to the centre.

Mr. Roux insists upon the period of ill feeling preceding the exhibition of confirmed rabies; during this latent period treatment has no more effects, yet a woman already treated at the Pasteur Institute, having been taken with lancinating pains in the bitten parts, was submitted to another treatment, and has remained well for two years past.—*Annales de Pasteur*.

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#### CONTRIBUTION TO THE THEORY OF SUPPURATION.

BY A. GRAWITZ.

Grawitz injected under the skin of dogs, with all aseptic precautions, spirit of turpentine, in order to produce the formation of abscesses. After two days the animals were destroyed, and the pus, as well as pieces of the tissues, were placed on plates of gelatine. Fifteen days later there were no indications of microbes. The scraping of the plates, mixed with distilled water and injected in dogs, gave rise to no swelling or inflammation. Suppuration produced by the injection of spirit of turpentine is consequently free from all micro-organisms.

In a second series of experiments, Grawitz mixed with pus free from all germs, and taken from a dog, a given pro-

portion of staphylococcus pyogenes aurens; these last organisms stopped their growth. The blood clot of dog is also an improper medium for their development. This fact is noticeable, viz., that the pus corpuscles of this nature are dead elements, unable by their special activity to incorporate and destroy the microbes. Grawitz had the same result with pus from a psoas abscess, entirely free from germs.

The histologic examination of the walls of the abscess, produced by the spirit of turpentine, showed that the conjunctive cells were in the form of karyokinesis, and passing through the various parts of the process of inflammation. Grawitz saw that the cellular products of the conjunctive cells in proliferation cooperated with the leucocytes in the formation of pus. Suppuration is then not produced by micro-organisms only, neither do leucocytes alone cooperate alone in the production of purulent collections.—*Rev. des Sc. Med.*

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#### IMMUNITY OF RABBITS AGAINST THE BACILLUS OF ROUGET OF SWINE.

BY E. METSOHINKOFF.

If, in a rabbit inoculated against rouget, a virulent liquid is injected in the sub-cutaneous cellular tissue, living bacilli are found at the point of injection for a time, of various lengths, a proof that these bacilli are not destroyed by a chemical substance acting very rapidly as an antiseptic, as said by Emmerich, and Mattei; after the injection of vaccine made in the anterior chamber of the eye, living bacilli are found for a certain time; then the aqueous humor gives no more culture, and before this complete destruction of bacilli, the bacilli of the vaccine are seen mixed up with leucocytes immigrated in the anterior chamber.

In introducing under the skin of the rabbit plates of glass glued together with wax and dipped in a culture of virulent bacilli, leucocytes are seen penetrating between the plates, and in their interior a more or less considerable number of bacilli were detected in now-refractory rabbits. Bacilli enveloped by phagocytes remain for a long time entirely normal and coloring perfectly, while in refractory rabbits these

bacilli become altered after a certain time, and color very badly.

Immunity against the rouget of swine is then a new proof in favor of the theory of phagocytes and not an evidence against it.—*Annales de Pasteur*.

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## EXTRACTS FROM FOREIGN JOURNALS.

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### TWO CASES OF CONGENITAL TUBERCULOSIS IN CALVES.

BY MESS. MALVOZ AND BROUVOIER.

The well known case of Johne, of congenital tuberculosis, finds a second instance in the record of cases reported by the author in the *Annales de Pasteur*.

CASE 1.—On the 25th of January they received from M. Lefevre, a veterinarian, the liver and lungs, with the lymphatic glands of an *eight months fœtus* found in the uterus of a cow that was affected with general tuberculosis. On the liver, near the portal fissure, were some diseased lymphatic glands. In the hepatic substance there were a few granulations, well defined, of a grayish-white color. At the hilus of the lungs, near the bifurcation of the trachea, were a few diseased lymphatic glands also. The microscopic examination proved them to be of a true tuberculous nature, Koch's bacilli being found in the giant cells, and in the texture of the granulation of the diseased structure.

In the second case, the lesions were found in a calf six weeks old. They existed on the liver, and in its substance. The lymphatics were all hypertrophied, at the hilus of the lungs were also found packets of lymphatic glands, also diseased. Giant cells were numerous in these tubercular lesions and Koch's bacilli were found both in the hepatic nodules and the lymphatic glands.—*Annales de Pasteur*.

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### ETIOLOGY AND THERAPEUTICS OF SPRINGHALT.

BY G. SANTINI.

Passing over a review of the various theories of Lissona, Abilgaard, Villate, Hertwig, &c., he specially considers that of

Renner, who had found at the post mortem as lesions of animals affected with springhalt, chronic inflammation of the great sciatic nerve. Then, reviewing the various treatments recommended, based upon pathological principles, such as the sections of the ilio-aponeurotic muscle of Hertwig, the tenotomy of the lateral extensor of the phalanges, (Boccar) the section of the internal patellar ligament, (Bassi) that of the aponeurosis of the shank, (Dieckerhoff) and then considering that of Renner which—based on the idea of spasmodic contraction of the posterior crural muscles—recommends the use of belladonna, aconite, stramonium &c., Dr. G. Santini considers the treatment recommended by Vachetta, viz.; the accupuncture in the region of the bicepo-femoris and semi-tendinous. This treatment was followed by recovery in two cases. In one, the springhalt existed in both legs, and a radical recovery was obtained by one application in one leg, and a considerable improvement in the other. In the second case, where myotomy and tenotomy had given no results, recovery followed two applications of accupuncture.—*Clinica Veterinaria*.

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#### TREATMENT OF ROARING.

BY DR. A. RUSSI.

The author claims to have obtained the recovery of a case of roaring in a horse by the trachael injection of a solution of sulphate of strychnia. After trying blisters over the laryngeal region, and electricity, without results, he administered the strychnia in five centigram doses, in five grams of distilled water. For six days he observed a well marked progressive improvement. *Ninety* days after this treatment the roaring was scarcely perceptible after a trot and a gallop of two hours. Complete recovery followed. The dose of sulphate of strychnia had been raised as high as thirty centigrams.—*Giornale di Vet. Militare*.

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#### CHLORHYDRATE OF COCAINE IN NEUROTOMY.

BY A. DEJONG.

To avoid the necessity of casting the patient, the author has tried use of this remedy in several cases, operating on the

front and hind leg in the standing position. He operates as follows: After shaving the region, he applies a bandage of Esmarck, places the horse in stocks, and puts a twitch on the nose. If he operates on the front leg, he has it carried forward; if he operates on the hind leg, he secures it in the usual way. Then carefully washing the skin with an antiseptic lotion, and selecting the place where the incision is to be made, he first injects in three different places about two grammes of a ten per cent. solution of cocaine. In from half a minute to a minute the incision of the skin is made, and the nerve dissected, secured and excised. It is prudent to drop a little of the solution on the nerve before excision. An antiseptic dressing is carefully applied.—*Siidschrift voor Verarts su Veetselt*.

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#### PASSAGE OF MICROBES THROUGH THE SKIN AND THE MUCOUS MEMBRANES.

From experiments made by Van Roth, under the direction of Koch, it results that the buccal mucous membrane is impenetrable for the bacterias. The simple application of pathogenic organisms upon the nasal mucous membrane of rabbits has, on the contrary, always given rise to local or general infection.

A mixture of bacterias in olive oil or in lanoline, applied by friction on the skin, has caused two deaths from anthrax out of three thus treated: the same virus without the grease has killed four out of five animals. The same application made with a paint brush has given negative results in seven cases. The author has demonstrated from his experiments and his microscopic sections that friction, while leaving the epidermis intact, allows nevertheless the introduction of the anthrax bacillus. He considers as possible the passage of microbes through the skin, even when there is no solution of continuity of the tegument.—*Beol. Thierarzt. Woch.*

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#### LONG INCUBATION OF RABIES.

A paper of Odessa reports that a person bitten by a rabid wolf and submitted to preventive inoculation by the Pasteur method, became affected after nineteen months, and died from hydrophobia.—*Ibid.*

## CONTRIBUTION TO THE STUDY OF THE CÆNURUS CEREBRALIS.

According to some authors, the almost exclusive seat of the *tænia cænurus* is the brain and the spinal cord, and the presence of this parasite in other organs is exceptional. Professor Rabe, of Hanover, reports several observations, among them one showing that this fact is not as uncommon as it is generally believed to be.

He mentions one case of Zurn, who found a *cænurus* under the skin of a sheep, and one of Nathusius, who found it under that of a calf. Similar facts are not rare in the hare and the rabbit, or even in wild ruminants. Mr. Rabe has found the vesicles of this *tænia* in the nervous centers, but also in the lymphatic glands of the thorax and of the abdomen, in the thyroid gland, and in the muscles of an antelope. In his view lymphatic glands and muscles would come next to the nervous center, among the organs where the *cænurus* is found.—*Ibid.*

## MELANO-SARCOMA IN THE CARDIAC MUSCLES.

Mr. Koch has observed in a white horse melanotic tumors developed in the muscles of the heart. The largest, which had the dimensions of a large chicken's egg, was protruding on the external face of the left ventricle. Another, the size of a large nut, was located in the interventricular septum, and formed a projection running towards the cavity of the left ventricle. Under the endocardium of the right heart, and on the septum also, near the valvular *cordæ-tendinosæ* of the auriculo-ventricular openings, were a number of smaller deposits, varying in size from that of a grain of rice to that of an hazel nut. There was no cardiac disturbance during the life of the animal.—*Ibid.*

## CONTRIBUTION TO THE STUDY OF REPEATED COLICS IN THE HORSE.

Repeated colics do not belong to a unique and well determined morbid entity more than any other colics. They may arise from an intestinal stenosis, the pressure of a calculus, or peritoneal adhesions between the abdominal viscera. Mr.

Eckardt, of Berlin, reports a case relating to this kind of colic. It was in a stable horse which for five months had frequent attacks of abdominal pain. The colics were light; the animal pawed, laid down carefully, and remained in that position stretched on his side. Often he would seat himself on his haunches. The abdomen was tympanitic and painful to pressure. The temperature always rose, though the pulse and respiration were not altered. There was no appetite or thirst. The feces were small or not present. The treatment was in every instance the same—eserine under the skin, a ball of aloes and bi-carbonate of soda with rhubarb and sulphate of soda. After a copious discharge, and a diet of twenty-four hours, the animal would recover, but only to be taken again the next day, or several days after. Death at length occurred during an attack more acute than the others. At the autopsy the stomach was found to be lacerated and the small intestine was united to the meso-colon by a strong band, and at this point the canal of the duodenum was considerably contracted, while in front of this it was dilated and hypertrophied.—*Ibid.*

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#### SULPHATE OF ESERINE IN PARTURIENT APOPLEXY.

M. Schmidt, of Crossen, has obtained three rapid recoveries by the subcutaneous injection of 15 to 20 centigrammes of eserine. In one case, where the purgative effect had not been sufficient from the first injection, the medication was renewed on the following day.—*Ibid.*

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### BIBLIOGRAPHY.

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VETERINARY MEDICINES; THEIR ACTION AND USES. By Finlay Dunn, Formerly Lecturer on Materia Medica at the Edinburgh Veterinary College, and Examiner in Chemistry in the Royal College of Veterinary Surgeons. Seventh Edition, Revised and Enlarged. Edinburgh: David Douglas, 1889.

The great progress made in veterinary pharmacology and therapy, since Dun last revised his text-book, has made all who relied upon veterinary sources for their guidance in the

study of medicines feel most sorely the need of a more modern work than the sole representative from the ranks of veterinary science, which had outlived its usefulness and was more of an ornament upon the shelf than the constant companion of the student. No branch of veterinary science has made greater strides within the last decade than has the study of drugs. New alkaloids have been discovered and applied to the treatment of disease, and to many are deemed of indispensable utility; observations and experiments have raised some of them very nearly, if not quite, to the dignity of specifics in their power over certain morbid states of the system. The length of time once required to establish catharsis in the horse was from twenty-four to thirty-six or forty-eight hours; discoveries and experiments have reduced this often fatal delay down to twenty minutes in some cases. The hobbles have been laid aside to give place to the new alkaloid of exythexylon coca, and many other steps forward have been taken and many are in process of development. If none others were brought out than the two mentioned, they would be amply sufficient to stamp the past decade as the most glorious in the history of *materia medica*. And yet the veterinary student had no text book recording anything much later than Harvey's discovery of the circulation of the blood. Such a state of affairs was discouraging to students in their study of this department; if their lecturer was only the least bit progressive he was so far in advance of his text-book that the latter became simply a member of the library whose occupation had gone.

For the present work the profession owes no little debt to its author, for the book not only steps abreast of the times in the matter of its contents, but its arrangement and typography shows life and spirit, and when placed in comparison with its parent edition it emphasizes how truly brave, and studious, and patient were the men who gained their education from its pages. The present edition has been almost entirely rewritten, rearranged and rehabilitated. The matter relating to the preparation and properties of medicine—which was once so voluminous that it absorbed the functions of the

Dispensatory—has been condensed; while the description of their actions on the several domesticated animals, and their therapeutical employment has received fuller and more systematic consideration. The author has introduced into this work a new classification which in many respects is a great improvement over anything previously attempted. Classification according to action has always been confounding, as many medicines have a variety of actions, and the same drug has to be placed sometimes in half a dozen groups, as, for example, alcohol is stimulant, irritant, narcotic, sedative, and anæsthetic. Dun adopts here the same classification used by Dr. Lauder Brunton, in his recent work, and it is at once quickly understood and to the student will greatly facilitate the study of individual drugs.

His “Index to Diseases and Remedies,” which in former works was a mere list of drugs usually prescribed in particular disorders, has been greatly enhanced in value by a synopsis of the condition which seems to indicate the employment of any certain medicine, together with the gross pathology of the disease, and the manner in which the drug is supposed to cure it.

An appendix is added to the work containing the unpublished notes of experiments, by Fred Smith and Charles Rutherford, of Aldershot, with aconitine, aloine and atropine. Their previous alkaloid experiments—reviewed in these pages over a year ago—are detailed in the body of the book.

In every department the book shows signs of infused life, having felt the need of it for so long a time no veterinarian should allow his library to contain only the old edition.

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## CORRESPONDENCE.

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### ARMY VETERINARY LEGISLATION.

*Editor American Veterinary Review:*

DEAR SIR.—The above subject having appeared under various aspects, I venture to express the views of some of the present army incumbents on the matter.

There are three (3) bills at present before the profession, viz., The New Jersey Veterinary Medical Association's, Dr. Lemay's (Seventh Cavalry,) and Prof. Huidokoper's. The two former secure the present incumbents, the lowest proposed grade without examination, and higher grades by examination, but Dr. Huidokoper's (if I am correctly informed), completely ignores them.

Now there are veterinarians in the army of long service so long in some cases, that were they combatants, they would be entitled to retire, with three-fourths their pay and allowances, and in fact some of them would be retired at once, under those conditions, by reason of ill-health, the results of hardships incidental to frontier service. These men have from five to twenty-five years faithful service, performing their duty to the Government to the best of their ability; one of them to my personal knowledge, by his writings on army veterinary subjects in various military journals, for the past six years has done incalculable service for the profession, has raised it, bad as it is, more or less from the deep slough it was in for years. These writings have caused many useful modifications to have been made in the feeding, shoeing and purchasing of public animals. He was the first army veterinarian recognized as a professional expert before a board of officers, and the introducer of the first veterinary bill, *from which all the present ones have been copied, with some slight modifications*, and he is at this moment a pecuniary loser to the extent of nearly five hundred dollars, by his personal efforts for its introduction into Congress. It certainly seems a hard and cruel case to kick those men into the world to starve or die, after their faithful and long services, several of them suffering from debility, and always the results of accidents and hardships incidental to the service on the frontier. Now, I think it will be very difficult to find a precedent for this proposed selfish action, in all the recent efforts at army reforms (and they are many).

When the new Hospital Corps was established last year, there were a great many old and useless stewards in the service. Were these men kicked out to starve? No; they

are retained until their time arrives for retirement and pension. Were the old contract doctors kicked out to starve, *although many of them are non-graduates*? No; there are two bills before Congress at present for giving them direct commissions.

Were the officers who were disabled at the termination of the late Civil War kicked out to starve? No; they were either retained, *crippled and useless* (as they were in great numbers) or compensated by pension, or lump sum of money down.

There are now about fifty officers awaiting vacancies, on the limited retired list for pensions. *Official boards have declared those men as being unfit for service.* Why are they not kicked out to starve? If a soldier of any service, be he commissioned or enlisted, gets disabled, he is provided with a comfortable home, or pensioned, *and frequently both.* *He is not kicked out to starve.* In your last issue, you say "it's a dirty bird that fouls it's own nest." Don't you think this homely and truthful proverb is specially applicable to this proposed selfish action of ignoring the present army incumbents? By all means do as is usually done in parallel cases; give us the lowest grade without examination, (there are but a few of us) and our chances of higher grades by examination, if we so choose, but if we "do stink in the nostrils" of our embryonic "principal army veterinarian and Major of Cavalry," then add a clause for our retirement and pension. Many of us are graduates of long standing, and hail from alma maters second to none. But it does not seem consistent with fair play and gentlemanlike action to ask us to step into an examination room, and compete against a young graduate, stuffed as full as a "Strasburg goose" with theory. If I would ask any officer of five or ten years standing, to compete on West Point subjects with a recent graduate of that well-known institution, I can anticipate his reply. I took advantage of a visit of our Member of Congress to his home for the recent holidays, to sound him on the subject, and his reply was characteristic of an old soldier and a gentleman, and it was as follows: "I will take good care that no bill shall

pass which will injure any army veterinarian." I may add that this gentleman is a prominent member on the Committee on Military Affairs. Whilst I am willing to make any reasonable sacrifice for the elevation of the profession, say of one or more month's pay, under the new regime, it is altogether another affair to snatch the bread directly out of my mouth. Our stipend is so small that it is impossible for any of us to live decently on it, therefore, the proverbial "rainy day" is unprovided for. "Self-preservation is the first law of nature," and "a worm will turn on the foot which crushes it." I know one or more army worms, who have friends in Washington, who will not fail to turn when any bill presents itself to their detriment or injury, and I question the policy of presenting any bill of the form now under discussion. It is all very well to theorize, but I certainly am candid enough to state my preference for my present position, (bad as some people think it) to that of commencing private practice without sufficient means to pay my railroad fare to the scene of my proposed private endeavors. I am forcibly reminded of the old rhyme:

God bless me and my wife,  
My son John, and his wife,  
Us four and no more.

That highly interesting process known popularly as "feathering one's own nest" is perfectly legitimate, laudable and human, provided the "down" is not obtained by stripping the feathers from other fowl who are unfortunate enough to be placed in a poor position for self-defense.

There is such a thing recognized as vested rights, and for which there is no greater advocate than our own War Department, (I have given some examples). An attempt at infringement of those, amongst even the North American Indians, is followed by the direst punishments. It is strange that there are civilized people whose selfishness will not allow them to get to the level of the untutored savage. Fortunately however, those gentlemen (save the mark) cannot be very dictatorial, as every bill has to pass two committees, and the poor fowl, whose feathers are thought necessary for

other and more downy nests, have voices, which will be listened to with as much respect and attention as the would-be "strippers."

If we must be examined, confine the examination to *practical subjects*, and let it be carried out previous to the examination of other candidates.

Dr. Griffin's letter in your last issue is highly instructive, gratifying and complimentary to him, no doubt. He is a young graduate and just appointed to the army, and I am sure anticipates with much ardor and pleasant feelings, "fleshing his maiden sword" in a competitive examination, but if he had from five to twenty years army service, and had made up his mind to die therein, his ideas would not savor so very highly of the romantic view of this question, particularly if a walking cane was necessary to assist his movements. A man suffering from old age, rheumatism, and kindred ailments, the results of exposure and field service, does not view those things in the same roseate hue as our young and enthusiastic friend, but probably a few years more would alter his ideas.

Army Surgeons are appointed First Lieutenants direct, to compensate them for their pecuniary outlay in getting a profession, whilst that of combatant officers is provided by government. Is not this equally applicable to veterinarians entering the army?

A MILITARY VETERINARIAN.

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### SPECIAL NOTICE.

"VETERINARIAN WANTED."

For particulars address, DR. J. W. SCHEIBLER, 310 Third St., Memphis, Tenn.

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### OBITUARY.

WILLIAM LOFT, JR.

Whereas, It has pleased Divine Providence to remove from our midst William Loft Jr., of Jersey City, New Jersey, an attentive and diligent student,

*Resolved*: That we the students of the American Veterinary College, keenly feel the loss of one of our sober and industrious classmates. And furthermore

*Resolved*: That we tender our sympathies to the family and friends of the deceased in this their great bereavement. And also

*Resolved*: That a copy of these resolutions be sent to the family of the deceased and published in the AMERICAN VETERINARY REVIEW and the students attend the funeral in a body.

A. F. BECKER,

T. L. SWIFT,

*Committee.*

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ALEXANDER LOCKHART, M.R.C.V.S.L.

We regret to announce the death of Alexander Lockhart, of New York City, which took place, from pneumonia, on the 17th of January. He was born in Glasgow, Scotland, graduated at Dick Veterinary College on the 19th of April, 1865, and at the Royal College of Veterinary Surgeons of London on April 24th of the same year, when he came to New York and at the death of his brother took charge of his extensive practice.

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ARMY VETERINARY LEGISLATION.

*Editor of American Veterinary Review*:

The Military Committee of the United States Veterinary Medical Association beg to report the following progress. The annexed bill has been introduced into Congress:

A BILL TO PROVIDE FOR THE ORGANIZATION AND RATE OF PAY OF A VETERINARY CORPS OF THE UNITED STATES ARMY.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*:

SECTION 1. That there shall be, and hereby is, established, as a part of the United States Army, a Veterinary Corps,

which shall consist of one Veterinary Surgeon-General, with the rank, pay, and allowances of a major of cavalry, who shall be appointed by the President of the United States, by selection, with and by the consent of the Senate; four veterinarians, with the rank, pay and allowances of captains of cavalry; ten assistant veterinarians, with the rank, pay and allowances of first lieutenants of cavalry, and ten assistant veterinarians, with the rank, pay and allowances of second lieutenants of cavalry.

§ 2. That as soon as practicable after the passage of this act the President of the United States shall appoint a Veterinary Medical Examining Board, which shall consist of the Veterinary Surgeon-General, two officers of cavalry, and two officers of the Medical Department, whose duty it shall be to examine such candidates as shall present themselves for examination for appointment in the Veterinary Corps, and shall report and certify to the Secretary of War the names of the candidates who shall have passed the highest examination satisfactory to said Board.

§ 3. That upon the receipt from the said Examining Board of the certificates of the candidates who shall have passed the highest satisfactory examination, the President of the United States shall appoint to the various offices junior to the Veterinary Surgeon-General, the said appointees to take rank according to the order of merit certified by said Examining Board, not to exceed the number provided for in section one of this act.

§ 4. That all veterinary surgeons of the United States Army who, at the passage of this act, shall be in service, may be granted three months' leave of absence with full pay, for the purpose of preparing themselves for examination.

§ 5. That the Secretary of War shall hereafter appoint, from time to time, a Veterinary Examining Board, which shall consist of Veterinary Surgeon-General and two veterinarians of the United States Army Veterinary Corps, to examine candidates for the position of assistant veterinarians, with the rank of second lieutenant and for promotion in the corps.

§ 6. That promotion below the rank of field officer shall be by seniority, but no officer of this corps shall be entitled to promotion thereby until he shall have been examined and approved by a veterinary examining board; and if any such officer fail on examination he shall be suspended from promotion for one year, when he shall be re-examined before a like board, and in case of failure on such re-examination he shall be discharged from the service.

The committee on Military Affairs of the House of Representatives before whom this bill will be considered is as follow :

Messrs. Cutcheon, of Michigan; Rockwell, of Massachusetts; Osborne, of Pennsylvania; Spooner, of Rhode Island; Williams, of Ohio; Lansing, of New York; Snyder, of Minnesota; Kinsey, of Missouri; Spinola, of New York; Wheeler, of Alabama; Sanham, of Texas; Wise, of Virginia; Robertson, of Louisiana; Cary, of Wyoming.

Every member of the veterinary profession is asked to use his aid in placing the importance of this matter before the members of Congress and is requested to report all information he can obtain to the committee.

RUSH S. HUIDEKOPER,

D. LEMAY,

COOPER CURTICE,

*Military Committee, U. S. Veterinary Association.*

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## SOCIETY MEETINGS.

### LONG ISLAND VETERINARY SOCIETY.

A regular meeting of the Long Island Veterinary Society was held December 18, 1889, at No. 74 Adams Street, Brooklyn, the President, Dr. George H. Berns, in the chair.

The roll being called the following members were found present: Drs. Geo. H. Berns, R. E. Waters, Wm. H. Pendry, Geo. F. Bowers, J. F. Mustoe, E. J. Decker, Wm. A. Engeman, Philip Newman, T. M. Buckley, D. S. Breslin, R. R. Bell, Samuel Atchison.

The minutes of the previous meeting were read and approved.

The Treasurer, Dr. George F. Bowers, made his annual report, in which he shows the society to be in good financial condition.

The Board of Censors reported progress.

The Committee on Army Veterinary Legislation made the following report :  
*To the President of the Long Island Veterinary Society :*

Your committee beg to report that they have given the matter referred to them careful consideration, that they have reviewed all the bills drafted, and have corresponded with those interested ; and while it has to be admitted that many of the proposed bills are, in a measure, commendable, for some reason or other they differ in their material points—some of the alterations proposed by veterinarians directly interested seem to have more or less a bearing of individualism. Your committee have, however, discussed and viewed the subject in all its lights from a disinterested point, and while the elevation of the profession in the army has been our object, yet we have not lost sight of the claims of the present incumbents consistent with that desire.

Therefore, we beg respectfully to submit the accompanying draft of bill, with a request that the same be endorsed by the Society ; that copies of it, together with this report, be printed and mailed to the different veterinary associations throughout the States and veterinarians interested, requesting them to return, at the earliest possible moment, their endorsement of the same, so that your committee can arrange to have the bill, backed by such endorsements, introduced at the opening of the next Congress.

All of which is respectfully submitted,

W. H. PENDRY,  
ROSCOE R. BELL,  
ROD A. MCLEAN.

AN ACT TO PROVIDE FOR THE ORGANIZATION OF A VETERINARY CORPS, AND  
FOR THE RANK AND COMPENSATION OF THE VETERINARIANS OF THE UNITED  
STATES ARMY.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled.*

SECTION 1. That there shall be established, as a part of the United States Army, a veterinary corps, which shall consist of one (1) veterinary surgeon-general, with the rank, allowances and pay of a Major of Cavalry, who shall be appointed by the President of the United States ; four (4) veterinarians, with the rank, allowances and pay of Captain of Cavalry ; ten (10) veterinarians, with the rank, allowances and pay of First Lieutenants of Cavalry, and ten (10) veterinarians, with the rank, allowances and pay of Second Lieutenants of Cavalry ; but no one shall be eligible for the position of Veterinary Surgeon in the United States Army, by examination or otherwise, unless he be a graduate of a legally chartered or incorporated Veterinary College or University, except as provided for in Section 6 of this Act.

§ 2. The Honorable Secretary of War shall have power to increase the number of Veterinary Surgeons in the Veterinary Corps as may be deemed necessary.

§ 3. The Veterinary Surgeon-General shall be charged, under the Honorable Secretary of War, with the administrative duties of the Veterinary Corps.

§ 4. Within three months after the passage of this Act the President shall appoint a Veterinary Medical Examining Board, which shall consist of the Vet-

erinary Surgeon-General and two officers of the Medical Department, whose duty it shall be to examine such candidates as shall present themselves for examination, and shall report and certify to the Honorable Secretary of War in their order of merit the names of such candidates who have passed examinations satisfactory to said Board.

§ 5. Within one month after the receipt from the said Examining Board of the certificates of the candidates who shall have passed satisfactory examinations, the President of the United States shall appoint to the various positions junior to the Veterinary Surgeon-General the said candidates, to take rank according to the order of merit certified by said Examining Board, not to exceed the number in Section 1.

§ 6. All veterinarians who at the passage of this Act shall be in the employ of the United States Army may be granted three months' leave of absence, with full pay, for the purpose of preparing themselves for examination; or if they so elect, shall, on the recommendation of their Regimental Commander, be appointed Veterinary Surgeon, with rank, allowances and pay of Second Lieutenant of Cavalry, but shall hold no higher position, except by examination as herein provided.

§ 7. The Honorable Secretary of War shall thereafter appoint from time to time a Veterinary Examining Board, which shall consist of the Veterinary Surgeon-General and two (2) veterinarians of the United States Army Veterinary Corps, to examine candidates for the position of veterinarian and for the promotion of veterinarians to such vacancies as may hereafter occur in the senior positions in the United States Army Veterinary Corps. Promotion to the rank of Captain to be by seniority.

§ 8. Applicants for positions in the United States Army Veterinary service (except such as are employed at the time of the passage of this Act) must comply with the same preliminaries as are now required of candidates for admission to the Army Medical Corps.

§ 9. This Act shall take effect immediately.

*To the President of the Long Island Veterinary Society:*

Your committee beg to report that they have had printed five hundred copies of the proposed Act, together with five hundred copies of report and circulars, and have mailed nearly the whole of them as recommended in said report.

That your committee have met since the last meeting of your Society, to draft circular and make one or two slight necessary alterations in bill; and your committee are pleased to state that they have received many endorsements of their bill.

That the Chairman of your committee, on receipt of a telegram from Professor Huidekoper, Chairman of the Committee on Army Legislation of the United States Veterinary Medical Association, met him in consultation on the matter of army legislation.

That they together saw Professor Liautard, Editor of AMERICAN VETERINARY REVIEW and discussed the matter fully.

That Professor Huidekoper produced a copy of a bill (which will be brought before the Society at this meeting), which he stated that the army headquarters was in sympathy with, that said bill is in substance the same, except that it does

not give any protection to present army veterinarians, and differs somewhat as to examinations. That both these gentlemen consider that it is very essential that only one bill should be presented to Congress, and that the two committees or representatives of said committee should consult together and agree on a draft of bill to be in substance the same as the one presented by this society.

Your committee have expended the sum of fifteen dollars and sixty cents for printing, etc.

Respectfully submitted,

W. H. PENDRY,  
ROSCOE R. BELL.

Moved by Dr. Breslin and seconded by Dr. Mustoe, that the report of Committee on Army Legislation, be received and accepted.

That the chairman of the committee be, and is hereby authorized to represent the Long Island Veterinary Society in a conference to be held with the Chairman of the Committee on Army Veterinary Legislation of the United States Veterinary Medical Association, for the purpose of agreeing upon the draft of a bill to be presented to Congress, which shall be in substance the same as endorsed by this Society, and that he is hereby authorized to accept for this Society such details of said bill as the army headquarters shall demand or that the interest of the measure may be deemed necessary to bring about the desired result.

That the sum of twenty (20) dollars be, and is hereby appropriated to defray expenses of said representative. Carried.

The Secretary was instructed to prepare a report of the condition of the Society, and file it with the County Clerk of Kings County, thus complying with the law.

Dr. R. A. McLean being the essayist for the evening, and being absent on account of the death of his sister, the reading of papers was postponed until next meeting.

The next order of business being the election of officers of the Society for the ensuing term, the following gentlemen were elected to the various offices: President, Dr. Geo. H. Berns; Vice-President, Dr. J. F. Musto; Secretary, Dr. D. S. Breslin; Treasurer, Dr. Geo. F. Bowers; Board of Censors, Dr. R. R. Bell, Chairman, Dr. Wm. A. Engeman, Dr. Samuel Atchinson, Dr. Wm. H. Pendry, Dr. T. M. Buckley.

The following resolution, which was made a special order of business for this meeting, was then taken up, namely:

“Whether members of the profession practicing other than on Long Island are eligible for membership in this Society.”

The discussion which followed was participated in by all the members present, particularly by Dr. Geo. F. Bowers and Wm. H. Pendry, and in order to determine the question, the following motion was put before the meeting, namely:

“That members of the profession practicing other than on Long Island are eligible for membership in this Society.”

The motion was lost by a large majority, thus confining the membership of the Society to members practicing only on Long Island.

After the reading of a number of communications to the Society the meeting then adjourned.

D. S. BRESLIN, D.V.S., *Secretary.*

## VETERINARY MEDICAL ASSOCIATION OF NEW JERSEY.

The regular meeting of this Association took place on the 12th of January in Newark. A number of Trenton veterinarians were present. An interesting discussion ensued on the bill requiring registration of veterinary surgeons. The topic was called up by Dr. Hamill, lately of New York City. He said that he was in entire harmony with the bill. He believed in it so far as it went, but claimed that it did not go far enough. He thought the profession should have placed a higher estimation upon its character and services than to limit the price of registration to one dollar. The price of registration should have been fixed at ten dollars. This would have added dignity to the cause.

Dr. Miller, of Camden, spoke of the difficulty of getting a bill of any kind through the Legislature, and the Association had accepted for the present what they could get on the principle that the half loaf is better than no bread.

Franklin Dye, of Trenton, stated that there is need of an efficient corps of veterinarians in New Jersey. The horses of this State are valued higher than those of any other State in the Union, and the same is true of the milk cows and beef cattle. We cannot afford to risk the lives of this valuable stock. Concerning the State Veterinary Association, the State Board of Health, the Bureau of Animal Industry and the State Board of Agriculture, they are working on too many divergent lines. They should be brought into closer sympathy of understanding and action as to the sphere and work of each. A vast amount of money is expended for the extermination of disease which does not seem to give corresponding results. Diseases of cattle especially are assuming new complications and are becoming serious. They affect not only the pocket of the owner, but also the consumers of milk, and this is true of diseased pork. This whole subject is one of general interest, and may require further Congressional and State legislation.

An interesting paper on "Swine Plague," was read by Dr. Julius Gerth, Jr., stating that to-day this disease can be found in every State of the Union.

An extended and animated discussion arose over the proper diagnosis of the disease which has been termed by some veterinarians *bovine variola*, or an aggravated form of cowpox, caused by the Buffalo fly; by others a new disease not yet accounted for. Dr. Dunston, of Morristown, said he believed that the milk from these cows is being sold to the public. Dr. Higgins, of New Brunswick, said that he knew that milk from cows suffering from this disease was being sold in the community.

The President was instructed to appoint a committee of five to investigate and prosecute all cases where veterinarians are practicing without being registered.

A committee of three, consisting of Dr. W. B. Miller, of Camden, Dr. Julius Gerth, Jr., of Newark, and Dr. W. H. Cooper, of Trenton, was appointed to attend the next annual meeting of the Board of Agriculture.

## OHIO STATE VETERINARY MEDICAL ASSOCIATION.

The Ohio Veterinary Medical Association held its seventh annual meeting in the Wells Post Hall, Columbus, Ohio, January 15, 1890.

The President, Dr. T. B. Hillock, called the meeting to order.

But fourteen members responded to the roll call. What the meeting lacked in numbers, however, was amply compensated by the vigor and enthusiasm of the few present.

The following officers were elected for the ensuing year: President, Dr. G. W. Butler, Circleville; First Vice-President, Dr. T. Bent. Colton, Mt. Vernon; Second Vice-President, Dr. J. D. Fair, Berlin; Third Vice-President, Dr. W. R. Howe, Dayton; Secretary, Dr. W. J. Torrance, Cleveland; Treasurer, Dr. T. B. Hillock, Columbus.

On account of the fact that an amendment to the Constitution had already been made, preventing the enlistment of non-graduates on the roll of the Association, the examination of whom (non-graduates) was the sole duty of the Board of Censors, it was decided by the meeting to suspend the Board of Censors until the next meeting, when a written resolution abolishing said Board might be voted upon.

Dr. S. S. Snyder, of Coshocton, Ohio, was unanimously elected a member of the Association.

The Secretary presented the correspondence for the past year, which contained among other matters of importance, resolutions prepared by Dr. Tait Butler, of Davenport, Iowa, requesting our Association to urge the United States Veterinary Medical Association to meet in future in some western city, preferably, first, Chicago, secondly in St. Louis.

The resolutions were laid upon the table, and it was decided that our Association urge the United States Veterinary Medical Association to be our guests at Dayton, Ohio. Wm. R. Howe, V.S., of Dayton, (Ohio Secretary of the United States Veterinary Medical Association), was requested to use his influence in furthering the desired object.

The only essayist present was Dr. J. S. Butler, of Piqua.

The doctor read an able paper on "Roaring," discussing the subject in all its phases and describing the operation for the same, as he had lately performed it upon three cases. One of the cases had proved a positive success. The other two cases were apparently equally successful, but the subjects had not yet been put to the final tests. Dr. Butler's paper received well-merited applause from those present.

The Treasurer's report was now presented to the Auditors. It showed a thriving condition of the finances of the Association.

A discussion was now opened upon Dr. Butler's paper and upon the details of his operations, by Drs. Shaw, Wight, Howe, G. W. Butler, J. D. Fair, T. B. Colton and others.

Dr. Torrance reported an unsuccessful operation which he performed upon a roarer.

The subjects of Spasmodic Roaring, Spasm of the Glottis, Choking, etc., were now discussed and cases relating thereto were reported by Drs. Gribble, G. W. Butler, T. B. Colton and J. D. Fair.

"Reports of Cases" were continued for the remainder of the afternoon session, some of the more interesting of which were as follows:

Dr. Torrance reported a case of Rupture of Diaphragm; also a case of a dead foetus which was retained by a mare for over a year in that condition.

Dr. J. S. Butler reported a similar case to the latter.

Dr. Gribble reported the removal of a mummified six-months-old bull calf which had been retained for two years *in utero*.

Dr. Colton reported a much similar case, due to torsion of the uterus in a mare, which still carries the foal.

Dr. Gribble spoke of the prevalence of tetanus among the suckling colts of his county, which Dr. G. W. Butler claimed was due to non-cicatrizization of the umbilicus.

Paralysis of the pharynx and similar affections were discussed by Drs. Gribble, J. D. Fair, J. S. Butler and Torrance.

Dr. G. W. Butler reported some peculiar cases of affections of the vagina of the cow. Among them was one case where he removed a fifteen pound tumor. He also referred to the effects of tracheotomy in the prevention of persistent straining in the cow.

Dr. Gribble referred to the cruelty to which animals were subject by empirics, who offered them forcible assistance in parturition, and Dr. Colton discussed the humanity of delivering cattle.

The meeting now adjourned and re-assembled at 7:30 P.M., when the President, G. W. Butler, addressed the meeting and thanked the members present for the honor they had done him in selecting him for President.

On motion of Dr. J. S. Butler, seconded by Dr. Wight, Dr. Yonkerman's charges of breach of etiquette against Dr. Shaw was tabled, and Dr. Shaw was completely exonerated.

The President appointed the following committees: Committee on Contagious Diseases, Drs. Colton, J. C. Meyer, Jr., and J. S. Butler. Committee on Veterinary Progress, Drs. J. D. Fair, T. B. Hillock and W. Gribble.

Moved by Dr. Gribble, seconded by Dr. Wight, that the Secretary be instructed to correspond with Dr. Salmon, with the hope of procuring a copy of the last report of the United States Bureau of Animal Industry for each member of our Association.

Reports of cases were again discussed.

Dr. J. S. Butler discussed pelvic abscesses, and reported a case of paraplegia due to melanosis of posterior aorta.

Dr. Torrance spoke of necrosis following electric shocks, and of melanosis producing lameness.

Dr. G. W. Butler reported a case of eversion of vagina in one and one-half year-old filly, probably due to shock of lightning.

Dr. Colton described a peculiar disease prevalent upon the river bottoms of Nebraska.

Dr. Gribble reported a chronic case of eversion of vagina in mare.

Dr. Wight reported case of intussusception in horse where twenty-one feet of ileum were found in cœcum.

Drs. Wight and Torrance reported cases of rupture of rectum.

Drs. J. S. Butler and T. B. Hillock reported cases of rupture of uterus in mares.

A few more cases were reported and the meeting was adjourned.

The next meeting will be held at Dayton, Ohio.

W. J. TORRANCE, V.S., *Secretary*.

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#### CALIFORNIA STATE VETERINARY MEDICAL ASSOCIATION.

At the last meeting of this Association the following officers were elected: President, Dr. Thomas Maclay, San Francisco; Vice-President, Dr. W. E. Morrison, Los Angeles; Secretary, Dr. A. M. McCollum, Sacramento; Treasurer, Dr. W. H. Woodruff, San Francisco. Drs. Maclay, Morrison, Whittlesey, Masoero and Egan were elected examiners of proposed members; and Drs. Spencer, Wadams and Egan, directors.

The following gentlemen were then elected members: Dr. J. Blackinton, Los Angeles, graduate of Ontario Veterinary College; Dr. F. C. Pierce, Los Angeles, graduate of the Chicago Veterinary College; Dr. W. B. Rowland, Pasadena, graduate of the American Veterinary College; Dr. W. J. Oliver, Los Angeles, graduate of the Ontario Veterinary College. Dr. J. K. Witherspoon, after being examined in veterinary dentistry, was also admitted.

Dr. W. E. D. Morrison, of Los Angeles, read an interesting essay on "Wounds and their Treatment." It was followed by a lively discussion, in which all participated.

Letters of regret were received from Dr. Egan, Dr. Orvis, Dr. Masino and others who were unable to be present.

The State Veterinary Society was organized a year ago last April, at San Francisco, and reorganized as a corporation in January last. Its objects are to prevent quackery as much as possible, and extend the scientific practice of animal surgery. The members of the Association are: Thomas Maclay, Petaluma; A. M. McCollum, Sacramento; C. B. Orvis, Stockton; J. P. Klench, Santa Rosa; P. P. Parent, Oakland; H. A. Spencer, San Jose; W. H. Woodruff, Thomas Bowhill, C. Masoero, J. D. Obrock, F. A. Nief, W. F. Egan, Peter Burns, W. H. Jones, J. D. Fitzgerald, all of San Francisco; W. B. Rowland, Pasadena; R. T. Whittlesey, W. E. D. Morrison, W. J. Oliver, J. C. Blackinton, F. E. Pierce and J. K. Witherspoon, of Los Angeles.

The Los Angeles members form a local association with Dr. Rowland as President; Dr. Whittlesey, Vice-President; Dr. Morrison, Secretary and Treasurer. The local society was formed in May last, and meets once each month for discussion of papers. The Los Angeles members, excepting Drs. Whittlesey and Morrison, were admitted to membership in the State Association Thursday evening.

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#### UNITED STATES VETERINARY MEDICAL ASSOCIATION.

The Comitia Minora of the United States Veterinary Medical Association will hold a session in February, to determine the place of meeting for the annual gathering in September next.

Those desirous of offering inducements or pleas for the place of meeting will be granted a hearing, or any resolutions will be considered, by placing the same in the care of the Secretary.

W. HORACE HOSKINS, *Sec'y*.

# AMERICAN VETERINARY REVIEW,

MARCH, 1890.

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## EDITORIAL.

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VETERINARY JOURNALISM.—President W. L. Williams' paper read before the Illinois State Veterinary Medical Association—his suggestions and our thanks—papers that have lived—they are doing their best—the REVIEW among them—our object and our motto—one for all—review of our efforts—the offers we made several times—they are evidences of our enthusiasm—recommendations of Dr. Williams—assist, not pecuniarily—but by actions—by writings—our proposal to the Veterinary Societies of North America—its acceptance will mean better journals and permanent records to those who will stand by it. ARMY VETERINARIANS.—Dr. J. A. Waugh, V.S.—letter and remarks. A NEW VETERINARY SOCIETY IN NEW YORK STATE. A NEW VETERINARY PAPER IN ITALY.

VETERINARY JOURNALISM.—We print in our present issue a paper from the pen of Dr. W. L. Williams, the worthy President of the Illinois State Veterinary Medical Association, which we strongly commend to the attention of our readers. It was read at a recent meeting of the Association, and many of his suggestions are, in our estimation, of peculiar value as relating to the subject of veterinary journalism in the United States. We gladly improve this opportunity to thank him for his appreciation of our services in this field, and for his very kind criticism of the work hitherto accomplished by the REVIEW. It is not our purpose in taking a retrospective view of the results of the labor which has been expended within the literary departments of our profession, to comment largely upon the number or the character of the publications which have from time to time passed from the hazards of delivery, within a period all too brief, to the throes of dissolution, nor to study too critically the constitutional

characteristics and aptitude for longevity of those which still maintain their existence. But we feel constrained to utter a word of animadversion upon the great lack of enthusiasm, indeed, of mere interest, not only in respect to the REVIEW, but to all our veterinary publications, among the membership of the profession. Let us first, and once for all, repeat the assurance that the publication of the REVIEW has *never*, at any time, been maintained with the object or expectation of making it a pecuniary success. Veterinary progress, the elevation of the profession, the benefit of its entire membership, and a true fraternization of individuals in our guild—these have been our objects, and their promotion our inspiration. The REVIEW has always striven to be *one for all*, but have the all been at the same time one with the REVIEW, is a question which may find an answer in Dr. Williams' papers.

Since the publication of its first number, the REVIEW has never missed its regular monthly issue, while every volume has been studiously improved to the extent of our resources and ability, without consideration of added labor, trouble or expense, and we have aimed to surround ourselves with some of the brightest lights of the profession, in order that our growth in years might be accompanied by a corresponding improvement in the scope of our aims and the realization of our aspirations. Then, when we had made sure of having achieved the necessary and desirable conditions, we lost no time in reducing our subscription price, as well as offering in addition, what some have called *generous* prizes, in order to stimulate the ambition of the writers and investigators of our guild. What have we not done, as occasions have arisen, in the line of advance and improvement? If this is not enthusiasm—and enthusiasm unrewarded and unappreciated, what can it be called? Truly, Dr. Williams is right. The REVIEW is and has always been strictly and essentially a veterinary journal. It has made its own way, and without fear of being taxed with lack of modesty, may claim to have made its mark. If it has encountered enemies, it has also made numerous friends, and still the point of perfection has not yet been attained, and although it has

held its own to the present time, and maintained its assigned position without visible signs of retrogression, it does not propose to be satisfied with only this, while still claiming by virtue of its birth in the United States Veterinary Medical Association, to be the authorized and qualified organ of the veterinary profession in America. But the REVIEW, in order to accomplish this, must accumulate more of her original enthusiasm referred to, and must follow and illustrate with more diligence than ever, her motto of "*Progress.*"

Again, as Dr. Williams urges upon our brethren, our magazine must not appeal in vain for higher and better co-operation; *not* pecuniary assistance, but literary support and contributions from the pens of trained writers. To you, our sympathizing colleagues; to you, our brethren in the profession, we still proffer the use of our columns, and ask you to communicate whatever you may encounter of professional novelty and scientific and practical interest; your original researches and discoveries, with reports of specially interesting cases which you may meet in practice. If with all this, the various societies through the country will favorably consider the urgent request we are about to make, we have little doubt that the REVIEW will in a short time be obliged to double the number of its pages, and enlarge its circulation to an uncomputable figure.

OUR OFFER TO ALL VETERINARY SOCIETIES OF NORTH AMERICA.—The REVIEW has been from time to time furnished by your Secretaries with the current minutes and reports of your meetings. In some instances, these records have been accompanied by copies of the papers presented, read and discussed at the meetings, but too often we are obliged to be content with a mere concise statement or memorandum of the numbers present, with a minute of the business transacted and the officers elected, and an appreciative report of the supper and of the adjournment. It is not in this way a scientific society can accomplish the greatest amount of good. If its objects are the increase of knowledge, the diffusion of information, and the elevation of our profession, how, under these, circumstances can the realization of these objects be

reasonably expected? Now, having in view the welfare of each one of your members, and in behalf of all of you as individual societies, for the benefit of the profession at large, and no doubt for that also of your veterinary organ, the REVIEW, you are asked to consider this request: Let every society, whether its meetings are held monthly, semi-annually or annually, send to our editorial office *all* the papers read at their meetings, with a concise statement of their proceedings, and *all* the matter in its entirety will be given a place in our pages, and we will in return, forward such a number of copies of each extra reprint, as may be indicated by the corresponding officers, to be kept or distributed as their own transactions. If this offer is accepted, who will be able to estimate the augmented value of the REVIEW *of the future!*

ARMY VETERINARIANS.—We have not been keeping the ball rolling in vain, and the subject of army veterinarians is now receiving at all hands the professional attention to which it is entitled. The following paper, prepared by Dr. J. A. Waugh to assist the military committee of the United States Veterinary Medical Association and show the actual personnel of our present United States veterinary service, has been received, and is of interest.

A LIST OF MEN EMPLOYED AS VETERINARY SURGEONS IN THE U. S. ARMY.  
COMPILED BY JAMES A. WAUGH, V.S.

Name.	Date of Graduation.	Name of Col. or Sch.	Date of App't as V.S., U.S.A.	Name of Cav. Reg.	Rank.
M. A. Piche, V.S.	Nov. 22, '86.	Mont. V. Sch.	Jan. 6, '87.	1st Cav.	Reg. V.S.*
John Robertson, V.S.	Mch. 28, '88.	" V. Col.	Nov. 1, '88.	2d "	" "
Wm. J. Waugh, V.S.	Mch. 31, '82.	Ont. V. Col.	Aug. 23, '84.	3d "	" "
Henry Hanning, V.S.	Mch. 16, '88.	N. Y. C. V. S.	June 18, '89.	4th "	" "
G. E. Griffin, D.V.S.	Mch. 4, '89.	Am. V. Col.	Sept. 17, '89.	5th "	" "
J. A. Waugh, V.S.	Mch. 31, '82.	Ont. V. Col.	Nov. 20, '82.	6th "	" "
D. Lemay, V.S.	Mch. 29, '79.	Mont. V. Col.	Aug. 20, '89.	7th "	Sen. V.S.†
Vacancy.	—	—	—	7th "	Jun. V.S.‡
R. B. Corcoran, Esq.	Non. Grad.	—	Jan. 6, '86.	8th "	Sen. V.S.§
M. J. Treacy, M.R.C.V.S.	Dec. '74.	R. C. V.S. E.	Jan. 7, '89.	8th "	Jun. V.S.*†
J. Tempany, Esq.	Non. Grad.	None.	Mch. 14, '79.	9th "	Sen. v.S.*‡
A. Macdonald, V.S.	Mch. 31, '82.	Ont. V. Col.	Nov. 24, '84.	9th "	Jun. V.S.
S. W. Service, Esq.	Non. Grad.	—	July 4, '71.	10th "	Sen. V.S*
F. Foster, M.R.C.V.S.	Apr. 28, '81.	Glasgow V.C.	June 12, '88.	10th "	Jun. V.S.

\* Graduate of "Montreal French Veterinary School," Jan. 17, 1887. This second diploma is an honorary one.

† Appointed Veterinary Surgeon First United States Cavalry, June 1, 1886,

resigned Nov. 1, 1886. Appointed United States "Infantry and Cavalry," School Instructor Hippology, Nov. 1, 1886; resigned Aug. 6, 1889.

‡ An ex-army veterinary surgeon is a strong condidate to fill this vacancy.

§ Appointed Veterinary Surgeon First United States Cavalry, 1877; resigned 1880; reappointed January, 1881; resigned January, 1886; literary graduate of St. Patrick's University, Carlow, Ireland. Never was a student in any veterinary or medical institution.

\*† Fellow Royal and Highland Agricultural Society, April, 1874. Appointed Junior Veterinary Surgeon, Seventh United States Cavalry, April, 1883; resigned September, 1887.

\*‡ Cavalry soldier, 1858 to 1863; cavalry soldier, 1867 to 1872. Appointed Junior Veterinary Surgeon Seventh United States Cavalry, March 19, 1872; resigned October, 1875. Never was a student in any veterinary or medical institution.

\*|| Notary public, general repairer and dealer in all kinds of jewelry. Never was a student in any veterinary or medical institution.

INCIDENTAL REMARKS.—Those appointments are made by the Honorable Secretary of War, upon recommendation of regimental commanders. The First, Second, Third, Fourth, Fifth and Sixth Regiments are each legally entitled to one veterinary surgeon, who receives a salary of seventy five-dollars per month, while the Seventh, Eighth, Ninth and Tenth Regiments are each legally entitled to two veterinary surgeons, one senior veterinary surgeon, who receives a salary of one hundred dollars per month, and one junior veterinary surgeon, who receives a salary of seventy-five dollars per month. They receive free quarters, light, fuel, medicines, instruments and generally a good saddle horse and all necessary horse equipments. Free medical attendance when sick. They receive first class transportation with Pullman palace car or state room tickets, hotel, restaurant and omnibus expenses while traveling or absent on detached service away from any military post. The actual cost of living is very cheap, as the commissary department furnishes a great variety of excellent groceries, meats, vegetables, tobacco and other articles at prices which can not be duplicated at any retail establishment in any part of our country. Milk and meats are very cheap, and there are no personal taxes. They are entitled to one month's leave of absence on full pay for each year spent in military service, not to exceed six months leave of absence at any one time. It seems strange that non-graduates have not embraced this advantage or opportunity to attend some good veterinary college or school while drawing full pay, and finally graduate and become members of a scientific profession. It seems remarkably strange that non-professional men are employed in professional capacities, and even draw larger salaries than well educated and competent men employed in like capacity in the same branch of the military service.

A NEW VETERINARY SOCIETY.—New York has a new Veterinary Association, a number of the veterinarians of the Northern part of the State having met—we have not yet ascertained where—(in January), and formed an organization under the name of the New York State Veterinary Medical

Society. We have only as yet received notice of this organization through a newspaper slip, and we can therefore say but little as to the newly born society. But if our memory is not at fault, there is already another body in existence bearing the same title. If we are not in error, have we not here a new illustration of the charming and salubrious harmony which has made veterinary medicine in the Empire State a proverb and a synonym for agreement and fraternity? And is not this fine fellow-feeling in some slight danger, under the circumstances, of encountering a slight jar or two? The veterinarians of New York will of course be pleased to hear of the advent of a new society, and in the meantime, we bid it welcome, and hope that its labors will greatly conduce to the advantage of all concerned.

A NEW ITALIAN PAPER.—Under the name of “Il Moderno Zooiatra,” Professor Salvatore Baldassare, of Turin, Italy, has started a new review of veterinary medicine and zootechny, with Professors Bassi, Brusasco, Longo and Vernita as assistant editors.

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## ORIGINAL ARTICLES.

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### ADDRESS

Read before the Illinois State Veterinary Medical Association,  
By President W. L. WILLIAMS.

GENTLEMEN.—The Illinois State Veterinary Medical Association begins its seventh annual session under very favorable conditions. Our increase in membership has not been marked by great accessions during the past year, but our organization has been greatly solidified and its working power increased.

Instead of the usual two meetings during the past year, we have had three, and these were all above the average of preceding meetings in attendance and interest, so that we may safely say that it has been the best and most profitable year in our history, and with the present harmonious and effectual organization, there is no reason why each succeeding meeting

should not be better than that preceding it. The harmony existing between the various officers and between the officers and members, has been unusually complete, no jar or discord of any kind worthy of mention having occurred. Probably the most noticeable defect in the internal workings of our Association is the disinclination of a large number of members to take an active part in our meetings by preparing and reading papers or essays. This tendency is to be deplored, and it is to be sincerely hoped will be successfully overcome, since in this way the Association is denied the benefit of such members' experience and thought, while they deny themselves the advantage to be gained by classifying and putting into shape their thoughts, and having them tested and criticised by their professional brethren. Such neglect may also permit some dreamers to fancy that certain members monopolize to too great an extent the time of the meeting by appearing too often on programme, when, in fact, the remedy lies within themselves, and all they need do to correct it is to prepare papers for the meetings. A programme we must have, or our meeting fails, and if one will not, the other must do the work.

For the first time in the history of our Association, it is my painful duty to announce that death has claimed one of our Association; one who, had circumstances permitted, would have proven himself a very useful and companionable member. James Brodie graduated from the Montreal Veterinary College in 1883 at the head of his class, and immediately after entered into active practice in the firm of Williams & Brodie, at Bloomington, and became a member of this Association in the fall of 1883, at its second meeting. Having received an inviting Government appointment in the Hawaiian Islands, he left Illinois, withdrawing from our Association, of which he was then Treasurer, in the fall of 1884. He remained in the Islands until failing health compelled him to resign his position in the fall of 1887, when he came to California, and after a few fruitless months to Colorado Springs, and later to Canon City, Colorado, where he finally succumbed to tuberculosis on the 17th of September last, aged

thirty-two. His withdrawal from our Association was intended to be temporary only, and had he retained his health, would doubtless have been with us now. He was an earnest and skillful veterinarian, a pleasant, genial, upright Christian gentleman, whom it was only necessary to know to admire. He leaves a wife and three children, and I would suggest that you pass suitable resolutions of condolence and sympathy with them in their bereavement.

Our profession in Illinois has lost one member, Mr. Walton, V.S., of Warren, who was accidentally killed last March. He was a graduate, I believe, of the Chicago Veterinary College. Legally, our profession in Illinois remains the same as at our last annual meeting, unrecognized and unknown to the laws of our State. We made an unsuccessful effort last spring, as you are aware, to secure the passage of an act to regulate veterinary practice. You are all presumably acquainted with the leading features of the bill, which, if passed, would, we believe, materially benefit the profession. The failure was due partly to the lateness of introduction, largely to the fatal hostility existing in the last Legislature to State boards, and largely to defections in our own ranks, even in our own Association.

It seems quite strange that members, when specially asked to attend our meetings and discuss legislative matters, should fail to do so, and then without having intimated their wishes to the Association, set up their individual opinion against that of our entire body and bitterly oppose our work, which they might have modified to suit their views had they expressed them at the proper time. Most of the opposition to the proposed bill seems to be due to a misunderstanding of the fundamental design of such laws, and confuse their own selfish motives with the public good. The primary object of veterinary medical legislation should not be the personal benefit of the veterinarians and the hanging of charlatans, but should be designed for the good of the general public, and the upbuilding of a useful learned profession, and then, should the members prove themselves worthy of their trust, indirect benefits would come in due season and measure. We cannot

expect a law that will arbitrarily throttle non-graduates and give graduates a monopoly of veterinary patronage. The true source of monopoly is by proving our decided superiority over non-educated men, and the inability to show this superiority is possibly what causes some graduates to clamor for a law which will give them a legal monopoly over non-graduates, against whom they have striven without victory. It is to be hoped that we will continue our efforts until we succeed in getting a reasonably good law, and there is no reason why we should not succeed soon if all work harmoniously. But with or without a law, how are we to attain the position in our respective communities which each desires?

In the first place, the veterinary surgeon needs to be a gentleman in all that the term implies, and by strict morality, sobriety and attention to business, refute the old idea that he may be anything *except* a gentleman. The veterinarian should be an earnest and conscientious student, carefully improving his limitless opportunities for clinical and post mortem study. He should also not only attend, but take an active part in our Association, submitting his own thoughts for the benefit of others, and freely asking advice from the Association on matters which may seem puzzling to him. The study of standard veterinary works should be kept up diligently, and possibly it is, but judging from investigations regarding the study of current veterinary literature as found in our veterinary journals, some grave apprehensions must be felt. Veterinary journals form the medium for the dissemination of current veterinary thought, and it would seem that each thinking veterinarian would be a subscriber to some such journal, but it seems safe to hazard the opinion that less than twenty per cent. of the veterinarians of Illinois are subscribers to veterinary literature.

Recent inquiries, with other objects in view, revealed the fact that out of more than one hundred regularly educated veterinarians in Illinois, only ten of them were subscribers to the only pretended exclusively veterinary journal in America, and to add to the surprise and pain, it was found that an

equal number of non-graduates were also subscribers, thus forcing a very uncomplimentary comparison, and suggesting the query: Is it because the graduates rely, in a self-conceited way, too much on their college education, and think they have learned all they need to know, or are they simply indifferent about knowing anything at all, so long as their diploma is a guarantee of legal right to practice?

There seems to be little doubt that what has been said of this one journal is equally true of all others, and I wish each of you to ask in your own minds if such treatment of yourselves and the veterinary journals is not shameful and without excuse. This brings me to another subject of great interest, the founding of a new veterinary journal, which was recently brought up at a meeting of the Iowa Veterinary Association, and brought to my notice by the following letter from one of the members, from which I quote:

"I feel that I would like to attend [your meeting], as I am desirous of having the subject of a good monthly veterinary journal brought up for discussion. I believe that the members of the profession are in need of such a journal, and I believe that there is enough talent and means among the members to produce and sustain a paper that shall be equalled by few and surpassed by none. I do not think that the AMERICAN VETERINARY REVIEW or the *Journal of Comparative Veterinary Medicine* meets the demands of the profession. They do not have that devotion and enthusiasm in veterinary medicine and surgery that such papers should have, nor do they dwell entirely upon subjects that are of interest to the profession generally."

Too much truth is unfortunately embodied in the foregoing letter regarding the general character of our veterinary journals, but as to not dwelling entirely upon veterinary subjects, the *Journal of Comparative Medicine and Surgery* makes no such claim, although offering much of interest and value, and well worth its price to veterinarians, but the AMERICAN VETERINARY REVIEW plainly insists upon its purely veterinary character, and though a careful reader of its pages for several years, I cannot recall any matter which has appeared

in it not purely veterinary in character and of general interest to the profession. As to its "enthusiasm and devotion," I would say that the veterinarians of Illinois pay annually on an average, about thirty to forty cents *per capita* towards the support of the REVIEW. About how much enthusiasm and devotion would you expect at such figures?

If the veterinarians of the Western States wish to found a new veterinary journal better than we now have, or as good, or even making any near approach to those we now have, they may place my name on their subscription list, and if desired on the contributors' list also, but this shall not abridge my loyalty or support to the old ones. But ere we launch a new journal, let us ascertain if possible the causes of the shortcomings of the old ones, and if these same causes might not cripple the new one. What are the essentials to a successful journal? I should say abundant, meritorious contributions, a long subscription list and a live editor. A successful and satisfactory veterinary journal cannot be made without sufficient meritorious contributions. The editor can write a few original articles and a few editorials, but were he equal to the task of filling the journal, there would be too much sameness and narrowness to constitute a readable veterinary journal. What have we and those veterinarians who are clamoring for a new journal done towards furnishing contributions to the existing journals? In the past volume of the REVIEW I find one original article from Iowa, and so far in the current volume I find none. In the same time I find four original articles from the pen of one member of our Association and one from another. I remember no contributions in the *Journal of Comparative Medicine and Surgery* from either Illinois or Iowa. Would such contributions and subscriptions awaken the needed devotion and enthusiasm in the new journal? Then the journal must find a wide-awake editor, with sufficient leisure to properly conduct it. Some of you well remember the recently deceased *United States Veterinary Journal*, of Chicago, born without an editor—at least without a veterinarian as editor—starting out with liberal contributions to its columns, and presumably a fair subscription list, which

slowly dwindled away, until, when it died, neither interment nor cremation was necessary. Now let me suggest that ere we launch a new journal, we try some experiments on one of the old ones, say the REVIEW. Suppose that ten of us agree to each prepare and read before our Association two good papers, each equal to five pages of the REVIEW, and when we have used them here, send them to the editor for insertion there, and then suppose that the Associations of Iowa, Indiana, Ohio and other States follow our example, what would be the result? Surely it would be a great boon to our meetings, but what a change such contributions would make in the REVIEW! The present cover would be too small, and it would require at least doubling in size to accommodate the material, and then we would have each year two volumes instead of one as now. And then suppose we quadruple our subscriptions, what would become of the editor? Might he not grow more devoted and enthusiastic under such conditions? Let us first carefully consider if it is not our own fault that our veterinary journals fall short of the desired standard, before we attempt to build a new journal on the infirmities of the old. I trust that some permanent good will come of this agitation, and that the members of our profession shall become more general readers of and contributors to current veterinary literature.

Another matter of importance to us is suggested by a letter to me from Mr. Knowles, V. S., President of the Indiana Veterinary Association, inviting our members to attend their next meeting, occurring at Terre Haute in June next. It seems to me that the interchange of these courtesies, and the more general acquaintance of the veterinarians of neighboring States, would prove mutually beneficial, and I trust you will take such action upon this letter of invitation and support it by so liberal an attendance at their meeting as to assure them of our hearty good will and fraternity.

There are some lesser matters, directly affecting the working of our Association, to which I wish briefly to draw your attention. Our Treasurer and Corresponding Secretary are

both empowered to receive moneys in such a way as to occasionally lead to errors and complications in spite of the efforts of the careful men you have always selected to fill those positions. Each must be duly informed of the actions of the other, making comparatively double work in properly caring for the funds of the Association. As a remedy, I would suggest that the two offices be merged into one. I desire also to suggest a change in By-Laws, Article I, by changing the election of officers so that it will occur near the close of the annual meeting, instead of at the beginning as now. My reasons for this are, that under the present rule the newly elected officers are abruptly ushered into their positions, without previous thought or preparation, and are at once charged with the work started by their predecessors and which should have been completed by them. The programme for our annual meetings is necessarily made by the retiring administration, and it should be allowed to carry it out. The reports of the officers of the Association are necessarily incomplete and misleading except at the close of the annual meeting. For instance, the last annual report of the Treasurer showed a considerable balance on hand, but the then retiring administration had contracted sufficient debts to entirely wipe out the surplus at the close of the meeting, and there being little income except at the close of the annual meeting there is still no surplus, but the administration of our finances during the past year has been economical, and if allowed until the close of the meeting to report, our retiring Treasurer could show, we believe, a handsome balance, while under our rules he can only show a depleted treasury, and the retiring administration can be allowed no credit for its economical management of our financial affairs.

In conclusion I desire to express my earnest thanks to my fellow officers, who have in every matter shown me the kindest consideration and loyal support, and I am only voicing the sentiment of the entire list of retiring officers, when I thank all members for the unusually friendly support you have accorded us during the entire year.

## PLEURO-PNEUMONIA.

A Paper read before the Royal Scottish Veterinary Society.

By PROFESSOR WALLEY.

Of late we have witnessed a remarkable recrudescence in the newspaper agitation as to pleuro-pneumonia, some of these organs, in fact, raising the subject to the dignity of a crisis; and while this agitation has largely arisen in consequence of the publication of reports by the various local authorities, of the bill of costs connected with the carrying out of the provisions of the Slaughter Order, I am afraid very much of it has had a selfish origin, and has been entered upon for such purely selfish purposes as a desire for fame, or, on the part of some, from a desire to pose as authorities on the question. But while such have been the motives of some of those who have engaged in the controversy, there are others whose sole object has been the harmless one of airing a particular hobby.

Again, there are others—"croaking pessimists" shall I call them?—who have endeavored to show that some prophecy they may have given utterance to, to the effect "that wholesale slaughter would never eradicate the disease," has been proved to have been correct by the fact that the measures now in force have failed to exterminate a malady which has been in our midst for upwards of half a century in the short space of eighteen months. Even the old cries of *spontaneous origin* and of "*the cure of pleuro-pneumonia*" have been revived; and the further statement is made that the Slaughter Order has encouraged concealment, and has neither added anything to our knowledge of the nature of the affection or of the means of dealing with it—matters which some propose to elucidate by means of experimentation. There are some correspondents, too, who still blame the large cities, as London, Edinburgh, and Dublin, for spreading the disease.

*The Slaughter Order.*

Having briefly reviewed this correspondence, I propose in the next place to deal *in seriatim* with the various statements and assertions to which I have directed your attention, and

firstly, in reference to the asserted failure of the Slaughter Order. Some time since, in referring to the suppression of pleuro-pneumonia, I made a statement to the effect that "if I were given a free hand I would undertake to eradicate the disease from these islands within the space of two years," but in making this statement I had in contemplation a very different method of dealing with the disease than that now in vogue. So far as it goes, the Order is radical enough in its aims, but it fails grievously in several essential points, which those amongst you who heard my remarks on the subject in this place, at the time the Slaughter Order was promulgated, will remember I directed attention to in the short address I gave on sanitation.

### *Concealing Outbreaks.*

The Order in its present form deals only with revealed or known centers of the disease; it says nothing as to the discovery of these centers, nor does it take any steps towards the attainment of this end; in fact, according to some, it favors the concealment of these centers, and in reference to this view of the case I would ask, are there any measures that could be devised that would effectually put an end to attempts at concealment? I have known the disease for the past thirty-two years, and without egotism, I may say have had opportunities of becoming acquainted with it which have been enjoyed by few practitioners now living in this country. I say I have known the disease for thirty-two years, and during the whole of that time—when there were no measures in force relating to it, when there was only restriction and compensation, and on through the period over which the Slaughter Order has extended—the feeling has existed amongst a certain class of stock owners that they were justified in concealing the existence of the disease for their own selfish purposes; and this feeling has not only existed in reference to pleuro-pneumonia, it existed in connection with cattle plague, foot and mouth disease, and sheep scab, and it exists now in connection with swine fever, glanders and anthrax; and will continue to exist so long as the world lasts and selfish people live in it

*Means of discovering Outbreaks.*

Now, Mr. President, I would substitute for the term "concealed centers," the exact opposite term, "undiscovered centers," and repeat what I have said over and over again, that it is the duty of the Executive to find out these undiscovered centers:—1st, by abolishing all private slaughter houses; 2d, by establishing public abattoirs, and insisting that all dead meat shall be taken to a *receiving house* connected with these; 3d, by appointing a staff of veterinary (not police) inspectors for the whole country, as was done in cattle plague time; 4th, by making the notification of disease compulsory, and by the making of post mortem examinations of the carcasses of all dead animals by State paid veterinary surgeons compulsory; 5th, by substituting imperial for local compensation; 6th, by increasing the area of infected circles, so far as the public exposure of animals for sale therefrom is concerned, and lengthening the period of segregation. In this country segregation of infected places for fifty-six days has always been considered sufficient, and the consequence has been that very frequently immediately on its expiry, or shortly afterwards, fresh cases of the diseases have occurred. In continental countries the isolation or maintenance of the cordon extends to months; in Canada a quarantine is insisted on to ninety days; in the United States and Australia to many months; and in Denmark segregation extends over six months, or even more; 7th, by giving power to the veterinary inspector to seize and slaughter every sick animal in which the symptoms are such as to afford reasonable grounds for the suspicion that it is suffering from pleuro-pneumonia; 8th, by scheduling tuberculosis as a contagious disease, and lastly, by placing the control of all measures introduced for the purpose of suppressing not only this, but other maladies of a similar nature, in the hands of one central authority.

If such measures as these I have just sketched were enforced, it would be almost impossible for unscrupulous persons to hide the existence of the disease in their premises for weeks or months, while they, during that period, are bringing

or sending the carcasses of the affected animals to convenient depots, and consigning the live animals to public sales or markets, and in this way scattering the disease broadcast through the country.

*Will Pleuro always be with us?*

And what of the cry as to the perpetual existence of the disease amongst us? You and I, Mr. President, were not alive a century and a half ago—probably neither of us recollect distinctly the occurrences of half a century since, even—but it is nevertheless a matter of history, that for one hundred years prior to 1842, pleuro-pneumonia was a stranger to this country; and looking back over the past quarter of a century, I can see in my mind's eye counties and districts free that were at one time hot-beds of the scourge. Even in this very city there has been a period of two years of absolute freedom from the disease since I have been dealing with it in an official capacity.

In Holland, Switzerland, Norway, Sweden, Denmark, and in many of the North American States, it is no more known; and in face of these facts, what right have we, I ask, to adopt the pessimistic view that pleuro-pneumonia is always to be a scourge to our herds. *Periodical epizootic waves* of this, as of all other similar maladies, have swept over our country, but there cannot be any periodicity of such epizootic waves if we take the trouble to annihilate the essential element upon which they depend. There were some who prophesied that when foot and mouth disease was suppressed we should be visited by a periodical epizootic in due course. Well, we have waited for years for this recurrence, and it has not yet put in an appearance.

*No Spontaneous Pleuro-pneumonia.*

*The doctrine of periodicity* had a worthy congener in the *doctrine of spontaneity*. Life cannot be brought into existence by fortuitous influences, and if we believe, as we are bound to believe, and as all analogy teaches us, that pleuro-pneumonia is due to a specific germ, then are we further bound to discard the notion that the disease can be induced by any

concatenation of circumstances that man can bring about. Starvation, bad hygienic conditions, exposure, ill usage, debility, and all other similar forces combined, will not produce one single case of pleuro-pneumonia. All the cases we meet with must have been due to others, and as reasoning and intelligent beings, it is our duty to find out where these other cases are hidden.

### *Pleuro-pneumonia Incurable.*

The assertion that pleuro-pneumonia can be cured is as little worthy of consideration as is the doctrine of spontaneity, but we cannot pass it by unnoticed. In the early days of my acquaintance with the malady, I treated, and assisted in treating, as many cases of pleuro-pneumonia as most men, and at one time thought a cure was frequently effected. The fact cannot be too strongly stated that *there is no cure for pleuro-pneumonia*; a lung or a part of a lung once affected can never again be restored to its original condition, but, on the contrary, it becomes for many months a slumbering volcano, waiting only for the influence of some disturbing agency to again rouse it into destructive action.

### *Disinfecting Centers of the Disease.*

Now, as to the large cities being, as it is asserted by some, distributing or disseminating centers of the disease, I know nothing of London, but I have learned something of Dublin, and I think it may be allowed that I do know something of Edinburgh. In reference to Dublin, there can be little doubt but that at one time it was a center from which the disease was spread broadcast through the country, but at the present time I think I may confidently say that while it is still a slight or probable source of danger, every possible means are taken to prevent the infection of the thousands of animals which are annually shipped for this and other countries at the port of Dublin. From an intimate acquaintance with those engaged in the sanitary work of the port, and with the manner in which this work is carried out, I am in a position to assert that no animals passing through the city of Dublin for em-

barkation to other ports, ever come within the range of even possible sources of infection.

In reference to Ireland generally, I have met with only one case of pleuro-pneumonia in recently imported Irish cows during the last epizootic of the disease in this city.

Now, in reference to Edinburgh, we have been frequently told that we are a *disseminating center*; I do not deny that this may be so, but we are to a far greater degree a *receiving center*. We receive animals from all the surrounding counties, from the northern counties of England and from Ireland, and these are dispersed throughout numerous grazing districts and dairying centers. We adopt every means in our power to prevent the introduction of disease, and for detecting its presence when it is introduced; but an unscrupulous dealer comes amongst us and swamps our market with an infected stock from one of those undiscovered centers to which I have already alluded, taking care at the same time not to risk the sending amongst us of any animal palpably diseased, and the result is we become the victims of the cupidity of one man, or of the supineness of another local authority, or, what is of more importance, the supineness of the governing body of the country.

#### *Dairy Cows Spreading Disease.*

Unfortunately, too, the animals which most usually introduce the affection are cows, the only class of cattle that find a home within our bounds; and one infected animal may be the means of carrying, indirectly, death and destruction into the midst of our dairies. And what remedy have we for this, or to whom are we to look for protection against it?

I have said that all that can possibly be done to guard against the introduction of disease is done, but if you consider for a moment the difficulties with which we have to contend in carrying out protective measures, you will see that there is little wonder we do sometimes become the medium through which disease is spread abroad in the surrounding districts.

Cows in an advanced stage of pregnancy, or that have just

calved, are sent long railway journeys to the city, jostled and tumbled about in railway trucks, exposed to the effects of cold, hunger and fatigue; they are put into our byres and washed from head to foot, then allowed to dry as best they may, and exposed the following day to the effects of inclement weather, and with this they are gorged with succulent food for the purpose of increasing the flow of milk, and in the vast majority of cases the lacteal secretion is allowed to accumulate to an inordinate degree, thereby inducing, with the other influences mentioned, a febrile condition, which frequently masks any evidence that may be present of the existence of disease of an important character.

So far as the spreading of disease by the dairy cows of the city is concerned, I am in a position to say that the danger in this direction is infinitesimal, as there is not one animal in one thousand sent out of our byres for any other purpose than for slaughter, and the vast majority of these cows never come in contact with store animals after they leave the byres; they are sent direct to the fat stock marts, on fat stock sale days, and are drafted thence to the various fat stock centers for immediate slaughter. The only danger that arises within the city is the returning to the market of animals which have been purchased on previous days of sale and found to be amiss after coming into the hands of the purchaser. Even this danger is guarded against as carefully as is possible.

*Experimenting with Pleuro-pneumonia.*

I have already remarked that a certain proportion of those who have written on this subject have advocated the adoption of experimentation on a *limited* scale with the view of clearing up doubtful points as to the nature of the malady and its cause. Now, Mr. President and gentlemen, I would ask you—of what value can *limited experimentation* be in this country, seeing that *unlimited experimentation* has been carried on in various continental countries for many years past, and seeing that much study has been devoted to the subject by men of far greater experience and with far greater opportunities than are possessed by any past or prospective experi-

mentalist in this country? I do not undervalue experimentation. On the contrary I would give it every support in my power; but at the same time I do not anticipate that substantial good can come out of it. In this country experimentation by veterinary surgeons, whether associated with biologists or not, has never been liberally encouraged, and even when attempts have been made by some of us to improve the method of inoculation, those attempts have been met with undeserved and ignorant censure, even from amongst the ranks of our own profession.

*The Great Cause of its Persistence.*

If the stamping out process has not taught us much, it has at least gone far towards verifying the opinions we have held as to the nature of the disease and the causes of its persistence amongst us. It has emphasized my contention of many years' standing, that the great cause of the persistence of pleuro-pneumonia in this country is the existence of infective centers of the disease in the lungs of animals which have been exposed to the contagion, but in whom there has been little or no evidence that they are the subjects of the malady. It is now some fifteen or sixteen years since I first promulgated the belief I had arrived at as the result of observation and experience, that animals which had suffered from the disease were

*Living Centers of the Infection,*

and that they were a source of untold mischief. This belief or opinion was, on its publication, endorsed, in the first place, by Professor Ferrein of Berlin, and it has been accepted in this country by all veterinary surgeons whose opinions are worth notice or respect; and the result of the Slaughter Order has more than established the truth of my belief, for with few exceptions the outbreaks that have taken place in this city during the last eighteen months have been traceable to such centers of infection, and particularly has this been the case in those outbreaks which owed their origin to cows from Cumberland. These infective centres have been a source of

mischievous, too, in the case of other districts, and especially in Fife, for, with one or two exceptions, such centers have been discovered in every lot of animals that has been brought to our abattoirs for slaughter as *healthy animals that had been in contact with diseased animals*.

### *Wrong Conclusions.*

Moreover, these infective centers are often the means of giving rise to wrong conclusions as to the particular animal which has introduced the malady ; and one example of this I will give you. A few months ago an outbreak of pleuro-pneumonia took place in an Edinburgh byre. The first case that was brought under my notice was in an Ayrshire cow that had been purchased about six or eight weeks previously at Dalkeith ; but on inquiry it was discovered that the bulk of the cows in the stock had been brought from a byre in the district of a neighboring local authority a short time before the date of the outbreak, and in slaughtering out the stock, one animal that had been purchased seven months previously from one of the lots of contaminated Cumberland cows sold in the Edinburgh market was found to have a very old encysted pleuro-pneumonia lung, or portion of a lung, in a state of active degeneration, and two others were subsequently discovered with cysts of a more recent date. In the *preinoculation period* in this city we found that in all the instances in which the disease lingered in a byre in spite of our efforts to suppress it, its continuance was coincident with the unconscious retention in the byres of cows in whose lungs old cysts existed, and that so soon as these were discovered and got rid of, the disease disappeared also.

In the *inoculative period* my experience was an identical one, and if time permitted I could give you particulars of case after case in which, in spite of inoculation, the disease continued to develop until the animals with old centers in their lungs were discovered and slaughtered.

### *Inoculation Impotent.*

The argument that inoculation renders these old pulmonary centers harmless is one that will not bear the slightest

examination; it is based on ignorance of pathological processes, it is an attempt to deceive the unwary, and it is disproved by practical experience.

But if more evidence were needed of the impotence of inoculation as a reliable suppressive measure, it has been furnished during the past twelve months. Altogether some half dozen cases have been brought to my notice in which animals inoculated by experienced operators have contracted the disease on its introduction to byres from external sources months after the period at which they were operated on, and rendered proof or protected against the malady; but of these instances I will only direct your attention to two. In the first of these the disease was introduced by a Cumberland cow to premises in which stood, in two separate byres (*a*) a lot of cows inoculated successfully six months previously, (*b*) another lot of recently purchased cows which were only inoculated at the time of the outbreak. A short time after the slaughter of the Cumberland cow, two cows of the (*a*) lot with docked tails developed the disease, but, let it be noted, they had never been in absolute contact with the diseased cow.

In the second instance an outbreak of pleuro-pneumonia occurred in two byres in a well-known dairy district in the city, and as a result thereof most of the cows in the adjacent byres were inoculated by an experienced operator, and three months afterwards a cow in one of these byres developed the disease with exceptional virulence, and on slaughtering out the herd we did not find another case—showing that the malady must have been contracted from the affected animals in the adjacent byres.

#### *Value of Inoculation.*

Inoculation is valuable as an accessory to other and more radical measures of prevention and suppression; it never has, nor never will, eradicate the disease from any country, and those who trust to its doing so trust to a broken reed. If one attack of the natural disease will not in every instance protect against a recurrence of the malady, how can we expect

that an induced and a milder attack will protect? Even the inoculating continental countries have failed to get rid of pleuro-pneumonia by inoculation, and its failure has been practically acknowledged by the recent vote of the Paris Congress, to the effect "that inoculation can only be recognized as an auxiliary measure to slaughter, and as a reasonable cause for delay in carrying out the latter," but in the next breath it was decided by the Congress "that inoculated animals must have no other destiny than the slaughter-house." With these resolutions I cordially agree; the conclusions are those at which I have long arrived. I have stated over and over again that inoculation is only of use in the prevention of pleuro-pneumonia, and that is as a protective measure in areas or circles in which pleuro-pneumonia has made its appearance, and in stocks in those areas in which it is believed that the animals are not actually affected with the disease. Even a well-known and an experienced inoculator in the neighborhood of this city emitted a declaration some time ago to the effect, "that every inoculated animal, when fit (fat) might go straight, and by float, to the slaughter-house."

### *The Slaughter Method.*

The method of slaughter for the suppression of pleuro-pneumonia has been dubbed a brutal and unscientific one. I would ask, in what way does the element of brutality come in, seeing that every animal of the bovine species that is brought into this world is destined for slaughter unless death from some other cause results? And as for the charge of its being unscientific, I am quite willing to admit the charge within a certain limit; but it has been proved on many occasions that it is the only method capable of bringing about the actual suppression of contagious maladies; and I am bold enough to assert that no malady of this class has ever been got rid of without its assistance.

It is obvious that such a method could never be made applicable to the suppression of contagious maladies in the human subject, although a statement has recently been going the rounds of the press to the effect that a Russian minister,

being charged with the suppression of an outbreak of plague in a village, deliberately placed a military cordon round the doomed area, and, after saturating the buildings with petroleum (or paraffin), consigned the village and its plague-stricken inhabitants to the flames, with the result that the plague was effectually suppressed.

*The Stamping-out Process.*

In reference to this matter, I would ask, by what means have the different contagious maladies that have at various times raged in this country been got rid of except by the "stamping-out" process? In 1862 sheep pox was introduced amongst certain flocks in the neighborhood of London; at that time, as now, there were two schools of suppressionists, one advocating inoculation, the other slaughter. After a trial of the former, and its failure, the advocates of slaughter, amongst whom (and probably the most important) was Professor Simonds, had their innings and won. In 1865-6 cattle plague ravaged our herds, and for months the scientific section of the suppressionists held the field with vaccination, introduced, be it remembered, by members of the medical profession, and, once more, after they had had their innings, the brutal method of suppression by slaughter proved the winner, as it has in every outbreak that has occurred in this country since. What but practical measures were employed for the suppression of foot and mouth disease? Have any other than practical measures been adopted for the suppression of swine fever, glanders, and rabies in this city and in other places? What has science effected in the eradication of scarlet fever, measles, typhoid fever, syphilis, leprosy, and a host of other similar maladies? Why, even in scientific Paris a resolution was passed at the Congress the other day, demanding the application of the most rigid, practical measures for the suppression of la maladie du coit.

If we want to lift the cloud that has so long hung over us, if we would regain our credit with the great stock-importing communities of the world, and remove those harassing restrictions which are in force against us in the Scandinavian

States, in many parts of the United States of America, in Australia, and even in our own Colonies, we must put our shoulder to the wheel, and spare no effort, be it never so radical in its tendency, to rid these islands from a scourge which has for long been a hindrance to the prosperity of the stock-raising portion of the community, and a disgrace to our sanitary system and to our sanitary knowledge.

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## HISTORY OF CONTAGIOUS AND INFECTIOUS DISEASES, ANCIENT, MIDDLE AGE AND MODERN.

BY J. FAUST, V.S., Poughkeepsie, N. Y.

(A Paper read before the United States Veterinary Medical Association.)

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### ANCIENT.

The most ancient information about fatal epidemics of domestic animals is found in Exodus 9; 3-10.

Among the punishments known as the "Egyptian Plagues," there were two which concerned animals. In the sixth plague malignant sheep-pox appeared on man and beast and was equally fatal to both. Ovid informs us that an epidemic arose on the Island of Ægina, 1285 B. C. which at first attacked dogs, birds, oxen, and sheep, and then destroyed all the other animals and the inhabitants.

The following were the chief symptoms of the disease in animals: An internal heat; a burning fever which could in no way be checked; inflammation and redness of the skin; a dry, split, and swollen tongue; and hard breathing. Homer also informs us (Iliad 1; v. 43-52) of a similar epidemic which attacked dogs, horses, asses and also the human race.

The writers of antiquity rarely mention these epidemical diseases of animals except when the progress of the disease extended to human beings, or when they existed over a large territory. Dionysus of Halicarnassus and Livy mention a series of such epidemics which occurred among the Romans. The most ancient of these arose about 753 B. C., another about 488 B. C., and another about 463 B. C. These attacked both man and beast. Other similar epidemics occurred 453,

431 and 430 B. C. Livy informs us that the last one was communicated to man by mere touch.

He called this disease "Scabies." But it is probable that he applied this name to all forms of sheep-pox. Other epidemical diseases broke out 309 B. C., and also 278 B. C. The chief characteristic of the latter was an epidemic abortion which became so wide-spread that it was feared that all animal life would die out. (Orosu Hist. IV 2).

After the taking of Agrigent, 212 B. C., a plague broke out in Sicily, a description of which is given us by the poet Silis Italicens (Liber XIX, 580-626). This attacked dogs, horses and cattle, and seems to have been, in general, a contagious disease of the lungs. Livy reports another epidemic, which broke out in Italy during the consulship of Petilius.

The writers of this time (Cato, Varro, Lucrez), especially Lucretius, mention, beside the scabies in sheep, also another disease which was called "Ignis Sacer"—"The Holy Fire."

This is also that disease which Thucydides mentions in his description of the plague in Athens.

The nature of this disease is best understood from the description given by Virgil in his *Georgus*. He describes several, according to the different forms of animal life attacked. The symptoms of this disease in horses were: A sinking of strength and spirit, and a total loss of appetite; their ears droop; they paw the ground, and, a short while before death, their skin becomes dry and hard, and cold and uneven sweats ensue. Plaintive cries, followed soon after by death, were the indications of this disease in sheep. One could see them dying in heaps. Virgil advised that the hide should also be buried, since the wool could not be cleaned, either by fire or water. If anyone wore the wool, sweats would appear on those parts of the body touched by the wool, which were followed by malignant pustules which ate into the flesh. Columella also reports (Lib. page 250) that, if this disease was not checked on its first appearance, it soon attacked the entire herd. Nothing was of any help, neither iron nor medicine. The expedient of Bolus Mendesius was alone useful in checking the progress of the disease. This

was a frequent examination of the back of the sheep. As soon as the least redness appeared there the animal was immediately killed and buried, skin and all.

This disease, which seems to have occurred very frequently in antiquity, probably corresponds to that in modern times called "Inflammation of the spleen."

Plinius and Celous, later on, made the name "Ignis Sacer" cover all sorts of inflammation of the skin having the nature of erysipelas.

The "dry scab" was another disease which frequently arose in Italy and caused great mortality among sheep.

Virgil considers that a cold rain, producing a salty sweat and allowed to remain on the skin of sheep after shearing, caused this disease.

The Malleus of Vegetius was a widely spread disease of solipeds which also attacked cattle.

Both glanders and hydrophobia must have been diseases long known, as ancient writers of different periods have described them. Aristotle himself describes glanders as a sickness of asses under the name "natis" its chief symptom being a tenacious ropy discharge from the nose.

Apsyrtus also mentions this disease; dividing it into two forms, the moist and the dry.

A similar fatal epidemic of animals occurred during the so called "Plague of Antonin," 190 B. C.

The nature of this epidemic, however, is not known.

Cardinal Baronius also mentions an epizootic sickness which arose after the predatory incursions of the Huns, and extended from Pænonia to the southern part of France.

The symptoms were, according to the poet Sulpitius Severus, a total loss of appetite, sudden loss of strength, dizziness, spasmodic convulsions of the limbs, swelling of the abdomen, followed very quickly by death.

Suckling calves rapidly died away, drawing the sickness from the diseased udders.

#### MIDDLE AGES.

It is a well known fact that long wars are generally fol-

lowed by the appearance of epidemic diseases which attack both man and animals.

In like degree can the frequent appearance and great extent of epidemics of animals be attributed to the continual wandering of tribes, while searching for new locations, and to the incursions into Europe of the nomad tribes with their immense herds. The space of time between the sixth and fifteenth centuries was marked by no fewer than thirty-two epidemics; the greater part of which attacked domestic animals in general, while only a few attacked single species. In a few, men and animals were alike attacked. Their extent varied widely. Some embraced all Europe, while others attacked only a few countries. France, Germany and England were the most frequent sufferers, while Spain and Italy were seldom affected, and then only over a small area.

We know very little concerning the nature of these epidemics, as there are no descriptions of them extant, and as only the time of their disappearance and the ruin which followed them were recorded. They are designated, in general, as "pestis" or "pestilentia," and are said by the chroniclers to be due either to excessive rains and floods, hot and dry summers, failure of crops and the resulting famine, comets, earthquakes, or similar causes. In many cases the disease was, undoubtedly, cattle-plague brought into Europe from the East by nomadic incursions. In other cases, the disease was "Anthrax," called even then "Ignis Sacer." When it attacked horses (as most frequently in Italy) the predominating symptoms were those of diseases of the chest.

The first recorded epidemic, arising in South France, and continuing at short intervals from 581 to 590, attacked cattle and horses, and, at its last appearance, even deer and other wild animals. Gregor of Fours writes of wonderful cures achieved by oil from the lamps of the church of St. Martin, or by burning crosses fastened to the foreheads of diseased cattle.

In 791 so great a plague broke out among the horses in the army of Charles the Great, that barely a tenth part of them remained, and Charles was forced to give up the cam-

paign against the Huns in which he was then engaged. In 801, after an earthquake in Rome, there arose an epizootic which extended over the dominions of Charles the Great.

The following epidemics are also reported :

809. A cattle plague spreading out from east to west. During Charles's campaign against the Witzen on the banks of the Elbe and Weser, so terrible a plague arose, according to the annals of Einhardt, that almost all the cattle perished. It also raged, not less terribly, among the other provinces. Soon after a plague-like disease, attacking both man and beast, was observed; this arose after long rains and great floods.

850. A destructive epidemic among the cattle in France.

868. In France all kinds of domestic animals perished in great numbers; also in 870.

878. Cattle plague in Germany on the Rhine.

887. An epidemic in France among cattle and sheep, causing heavy losses.

896. An epidemic broke out among the horses of Arnulph's army during his retreat over the Alps; shortly before and probably at the same time epidemics broke out among cattle, sheep and swine all over Europe.

940-942. Plague in France and in Germany among the ruminants during the last year. These were so severe in France that almost all the cattle perished.

987. An epidemic attacked both man and cattle, the latter being known as "Scittas" or "Schittas" in England. This was likewise very fatal.

992-995. A disease attacked both man and beasts (Agnis Sacer.)

Diseases of animals further occurred: 1044, in Germany; 1048, in England; 1059, in Germany; 1085, in France; 1086 and 1087, in England; 1089, in Lorraine (Agnis Sacer); 1092-1094, over all Europe; 1098, in France (Agnis Sacer) and in Syria during the siege of Antioch; 1111, in England, also 1124 and 1125 among all domestic animals; 1127-1129, in France; 1131, in England; 1171-72, over all Europe; 1213, in Spain and France.

From the beginning of the twelfth century till 1241 took place the incursions of the Mongolians, who, as is well known, penetrated to Silesia. To these incursions may be traced the origin of the disease of cattle which broke out in 1223, 1233, 1235, and which undoubtedly was the cattle-plague. The first lasted three years and spread out from Hungaria over Italy, Germany and England.

“In the year 1223 there was a great mortality among cattle and people, which lasted three years, so that the greater part of the cattle perished;” says the Chronicler.

In the years 1223 and 1225 a similar disease attacked horses and chickens.

1252. An epidemic of anthrax raged in England.

1301. Laurentius Rusus speaks as follows concerning an epizootic which arose among the horses at Rome: “The horse hung his head and refused to eat, its eyes were watery, the iliacs continually beat.” This disease was epidemic, and from the year 1301 there died in the city more than a thousand horses. In 1313 a similar epidemic broke out again in Rome.

In the great epidemic which attacked men, called the “black death,” horses, cattle, sheep and goats also fell victims.

1375. A great plague broke out in Germany, confining itself to wild beasts, which attacked deer, wolves, bears, wild boars and foxes, and almost entirely destroyed them.

#### MODERN.

Modern diseases of cattle have been just as frequent and devastating as those of the middle ages; attacking not only all the species of domestic animals, but also game and fowls. Especially frequent were “anthrax,” chicken-pox, influenza among horses; and still more frequent, the cattle-plague, which at times almost entirely destroyed the live stock of Europe. In many cases these plagues broke out together with or as a result of epidemic, as, for example, the small-pox, commonly called the “black death.” Others were caused by small harvests, which caused famine. They were also greatly aided in their devastating career by the numerous wars of this period, especially the Thirty Years War, the war of the

Spanish succession, and the Seven Years War, accompanied by the total lack of sanitary measures, which were first introduced in the beginning of the 18th century. More complete and better descriptions are extant, written by physicians who made an accurate study of the phenomena and the course of the epidemics. We are therefore in a better position\* to decide what diseases were involved in the several epidemics. Fracastoro has left us notes on one of these, which appeared among the cattle in Italy in 1514. It was first observed in the Friar, whence it spread into the territories of Venice, Verona, and later into France and England. The principal symptoms were: loss of appetite and inflammation of the palate, the mucous membrane of which was covered with pustules; soon after a rash appeared on the shoulders and limbs. If this did not appear, the disease generally proved fatal.

Some authors, as Dupuy, think that this disease was smallpox, others consider it the "cattle-plague" (Louiser.) Heisinger, however, calls it stomatitis aphthosa maligna. In the following year (1515) a very destructive plague raged in France, called "tac," of which no description is extant; it is also unknown from what source the name is derived. Belon, a physician of the sixteenth century, conjectures that it is named from the "talsol" (an ampyreumatic oil, known now in the Languedo as "Oil de Cade") which was used extremely as a remedy for the disease. Paulet, however, believes that the disease was named from its contagious nature, it being transmitted by touch. Probably it was the same disease as that which broke out among the cattle in the preceding year. In 1552 an epidemic broke out among the cattle of Lucca, which proved very fatal. Thomas Wierus relates that while the farmers killed the diseased cattle, if any blood spattered on them, carbuncles soon after appeared. It was probably anthrax. In 1568 Joubert, in his work concerning the plague, for the first time mentions the pox among sheep, which he observed with Rabelais in the neighborhood of Montpellier. In 1599 a very destructive epidemic raged in Italy, simultaneously with the pox there and in France. The Senate of Venice issued (according to Ramazzin) an edict for-

bidding the sale of beef, butter, milk and cheese, fixing the penalty of death for the offense, in order to prevent the possibility of the disease attacking the people.

In 1610 an epidemic broke out in Alsace, together with the pox, which seems to have been gloss anthrax of a species of stomatitis aphthosa and which was, according to Mercurialis, transmissible to man. In Venice it was called "Gian-dussa." A species of cattle disease broke out in Saxony (1643) called by Weeks the "flowing plague," which proved fatal to many thousand head of cattle. The only remedy was to mate the animal with a horse; if this was done before infection, all danger was averted.

Thomas Partholinus reports that a sort of frenzy attacked animals in Denmark, after a very hot, dry summer in 1661, making them almost wild. It attacked both horses, cattle and sheep. On examination after death, one or more worms were found in the brain.

In 1682, while the plague was raging all over Germany, a very destructive epidemic broke out there and in France, Switzerland, and Poland, called the "flying cancer" or "tongue cancer," doubtless, however, anthrax of the tongue. This disease spread with extraordinary rapidity. Vogel says in the Leipzig Annals, "This disease spread in twenty-four hours over an extent of territory two miles long by four broad;" and Dr. Winkler, physician to the Elector of the Palatinate, reports "that the disease did not appear simultaneously in different places, but that it kept a fixed course, without missing a village on its route; the under side of the tongues of the diseased cattle became covered with white inflamed pustules, which in a short time encircled the tongue, and if no remedies were employed, the tongue fell from the mouth in twenty-four hours, causing the animal's death. After death the tongue was found to be rotten and eaten away; in some were found traces of malignant quinzy, in others traces of milt. It was observed, both in Germany and France, that those who attended the diseased animals were themselves soon attacked. The most effective mode of arresting the course of the disease was to scrape the tongue with a piece

of silver or iron until blood came, and to wash out the wound with a mixture of vinegar, pepper and salt. A case is known where a man died of the disease through eating from a spoon with which scraping had been done.

In 1690-'92, a great mortality existed among the cattle of North Italy, simultaneously with the intermittent fever among the inhabitants of that part. Ramazzini thinks that it was caused by spoiled fodder which had been covered by sour mildew. The leading symptom was the breaking out of pustules on the head, neck, and on the shanks, which resembled the pox in form, color, size, and the course of the disease. Most of the diseased animals became blind or died from exhaustion and loss of strength. Swine died in droves as if choked to death. In the summer of 1691 the sheep were almost entirely destroyed. In 1692 Hussia lost the greater part of its cattle through a malignant disease of the lungs. Valentine says, that on making an examination, the lungs were found to be turned into matter. He thinks that the causes were a sharp, bitter frost, and a severe cold. The first case of pox attacking sheep ever known in Germany, occurred there in 1698, a description of which is given by Stegman. Of the epidemics of the eighteenth century our attention is first claimed by an epidemic among horses in the beginning of the century.

In 1702 it was observed on the banks of the Rhine and in Lombardy, and in the following year on the banks of the Oder.

In 1704 it spread into Poland, Alsace and the Netherlands, where it raged so much that all commerce with England was forbidden. It lasted till 1705 in Poland, Saxony, and on the Rhine. The cattle plague, however, possesses the most interest for us. It was first observed (1709) on the boundaries of Europe and Asia, and in the Tartary regions; Kanold, in his early history, is uncertain whether it first broke out in these regions, or whether it was brought over from Asia, or was a "malum endemium" in this region, as the small-pox in Egypt and Turkey.

It was first observed in Astrachan, on the banks of the Don

and Volga, from whence it spread out to Casan and Moscow, where it caused great ravages among the cattle and horses, especially the latter. Nothing special is known about the nature of the disease, except:

1st. That it was very contagious, even when it first broke out.

2d. That it killed the cattle in great numbers very quickly.

3d. That there was no known remedy.

4th. That it spread slowly over the adjoining territory.

5th. And that it spread out in a few years over very many rich lands, even with the best food and weather.

This disease continued until, in after years, more attention was paid to its character and form.

In 1710 the cattle-plague broke out in Russia in the provinces of Rusar, Woratin and Moscow.

In 1711 it spread out through Poland to Silesia, Brandenburg and Prussia, where it raged in the neighborhood of Hoenigsberg. In Silesia it appeared around Ohlan and Brieg, and was so fatal that the streets at times were filled with dead cattle. From Hungaria the plague reached Steirmark, Austria, Bavaria, Swabia (in Augsburg it appeared at the end of summer 1711), Dalmatia and Italy.

It was brought into the latter country by Dalmatian traders who brought droves of cattle from Hungaria into the Venetian territory. From there it spread into the Milanese territory, and also Genoa, Ferrara, the Roman territory, and then to the Kingdom of Naples. In this period Ramazini and Lancise wrote their admirable description of this disease. This disease usually began after a heavy frost followed by intense heat. The respiration was labored; a thick slime possessing a very acute odor flowed from the mouth and nose. The very frequent passages had a very fetid odor, and were often streaked with blood. The ruminating ceased, and pox broke out on the fifth day whose similarity to the small-pox caused Ramazini to name the disease "oxen small-pox." Death occurred from five to seven days. Lancise, however, claims that the disease was the true "plague," and was identical with the Greek "Nadis." On making a post-mortem examination

the following was found: a black mass of hay in the first stomach; water-blisters on the surface of the intestines, which possessed a very fetid odor as soon as opened; and sores on the root of the tongue and water-blisters. Both the authors unite in the opinion that cauterizing and the seton were the best remedies. Several internal remedies were also recommended: camphor with gentian, tormentil, centanry, etc.

The mouth of the animal was washed out with a mixture of salt and vinegar. Schroeck thus describes the disease: "It is a well known fact that the disease is infectious. The spittle, which was scattered by the sick cows while pasturing, transmitted it to the rest. It is, doubtless, a malignant dysentery." In 1712 this plague spread out from the Tyrol and Switzerland and through Germany to Thuringia and Saxony; from Franconia into the States of Newberg, Anspach, Ramberg, Wurtzberg, Baden, on the Rhine, in the Palatinate, Alsace, Lorraine, France and Holland, in which country alone over two hundred thousand (200,000) head of cattle died. In Russia it spread out over Novgorod, Petersburg, Ingria, and Livland. In Italy the Piedmont was the only country not immediately attacked. It broke out there in 1714 with such violence that seventy thousand head of cattle perished. In the same year it appeared in England, also causing a loss of seventy thousand head. By Lancisis' advice all the infected cattle were killed; over six thousand cattle being destroyed in this manner in the counties of Middlesex, Essex, and Surrey alone. By this means the epidemic was stopped in three months.

The English were, therefore, the first to make use of this method, which now is generally employed. In 1715 the epidemic lessened somewhat. It yet existed in Holland, the northeastern part of Germany, several cantons of Switzerland; in Milan, Piedmont, Lucca, and in several districts of France. Inside of a few years it had entirely disappeared, except in the province of the Scone, where it raged violently as late as 1721-'22. Isolated cases appeared later, especially in Hungaria, Prussia, Silesia and Bavaria, without, however, spreading any. A new outbreak of the cattle plague occurred in 1724.

Starting from the boundary of Poland, where it never totally disappeared, it spread into Germany, where it caused great devastations, especially in Thuringia and Saxony; in 1728 it invaded Brandenburg and in 1729 Austria; in 1730 it broke out again in Saxony and extended to Istria, Friaul and the Venetian States. It spread still further in 1735-'36. A Venetian bulletin issued on the 9th of October, 1735, announced that the plague existed in Friaul, Basanese and Trevigiano. December 3, of the same year, it already had spread over Verona, Brescia, Crema, Mantua, and Milan; shortly after it entered the Roman district and the Piedmont, where it remained till 1739.

Between 1740-'50 it spread again over all Europe. Starting from Hungaria it quickly entered Bohemia, Bavaria, and southern Germany, remaining there till 1745.

In 1742 it was brought into the Lorraine. In the same year it entered, from the Swiss side, the Dauphine and Franche Compté, and in 1745-'46 caused fearful losses throughout France. It entered Saxony and Thuringia again in 1746. It was carried into Italy through Piedmont, during the wars of 1744-'45, and through Menetia, when it first ceased in its terrible career in 1749. Its fearful power was most felt in Holland in 1744-'46, when over two hundred thousand head of cattle perished. In England the epidemic broke out in the vicinity of London, whence it spread over the whole kingdom, lasting there longer than in any other country; first lessening in 1758. Isolated outbreaks occurred even as late as 1780. During the third year of the epidemic, killing the infected animals was again tried with but little effect; although eighty thousand cattle were killed in that year alone. Nottinghamshire and Leicestershire lost over forty thousand head in 1747, while Cheshire lost thirty thousand in six months.

In 1745-'49 the cattle-plague arose in Denmark and Sweden, 1747-'53, in Curland and Livland, and 1750 in Prussian Lithuania. Isolated outbreaks, embracing but little territory, were observed in 1757 in Minden (2), where it was brought by the French army, and also in 1758-'59 in Brandenburg. Europe's total loss in cattle between 1740-'50 is esti-

mated at 3,000,000. Other epizootic diseases of domestic animals occurred besides the cattle-plague. In 1712 an epidemic broke out among the horses around Augsburg, which later attacked also cattle, swine, geese, turkeys and deer, and which seems to have been anthrax according to the description of Schroeck. Another very fatal epidemic broke out at about the same time in Russia, Lithuania, Podolia, Volchynia, Moldau, Wallachia, Prussia, Pomerania, Brandenburg, in fact throughout Germany, in Belgia and in the north of France.

It moderated only when winter arrived. It raged especially among the horses of the army, so that sometimes some companies had hardly twelve horses fit for duty. It was noticed even in Italy, in Naples and Rome, and was called "an epidemic horse fever," by the Italian physicians.

Lancisius has also left us a description of this disease. "It had both an acute and chronic form." In the acute form a severe chill attacked the animal; it lost its appetite; the activity of the skin ceased, causing cramps and an inflamed condition of the intestines and of the kidneys. Death occurred in forty-eight hours. On making an autopsy the intestines, stomach and diaphragm were found to be inflamed. In the chronic form the animal lost its appetite and hung its head; the throat was swollen, breathing became labored, and a sort of rattling was heard in the throat; the animal became very uneasy. If the hair lost its lustre and smoothness, if the urine did not pass, and cramps followed by cold sweats occurred, the animal generally died.

If, on the contrary, a tenacious slime flowed from mouth and nose, if a bad-smelling urine passed off, and if the limbs swelled up, the animal recovered. Heisinger is inclined to identify this disease with our influenza. In 1714 an epizootic arose among the sheep. In the kingdom of Naples over 50,000 sheep and lambs perished. The same mortality among sheep and goats was further observed in Poland, Prussia, Silesia, Saxony, Franconia, Bavaria, Swabia, Austria, Hungaria, France and Holland.

The disease was probably the cattle-plague, the occurrence of which, among sheep, is pretty well proven. Kanold gives the following description of this disease;

“The sheep began to tremble and soon became so weak as to lie down, though they continued eating; they had no geding.” The head and neck often were swollen up, which was thought a very bad sign. The pregnant sheep generally aborted, or, if not, had “*ubera flaccida*” and “*defectum lactis*.” The beautiful white wool turned into a dirty, dark color as if filled with sand. In this condition death set in in four days, or, at the most, in seven days.

On making an examination considerable water was found between the hide and flesh; the viscere were inflamed; the gall was large in some, in others small; the lungs were inflamed and sometimes even rotten, and the heart was weak and flaccid. This disease was very contagious and was often carried about from one place to the other by the shepherds in their clothes. Colerus thinks it the result of unhealthy, hot weather. In 1714 the “flying cancer” raged among the sheep in some parts of France and also the pox there and in Italy. The society of Geneva physicians (*Reflections sur la maladie du gros betail par la soc de med. de Geneva, 1716*) has left an accurate description of this disease, called in France *clavean*, *clavin*, or *clavelee*. They report that about five per cent. of the cattle died, and that no remedy was known that was of any use.

In Silesia and Bohemia, after a very hot and dry summer in 1718, different kinds of diseases broke out among domestic animals.

Kanold reports that the scourge was very widespread among the horses in one district. This sickness affected the tongue, which became full of pustules and holes, hindering their eating. In several districts the sheep commenced to cough. In the districts of Frebnits it was reported that the acorn-swine in the woods were affected with a sort of scourge which was very fatal. In the district of Medzibor, during the month of July an epidemic arose, boils breaking out on the neck and choking them; if these were opened in time there was hope of saving the animal. In 1719 the pox broke out among the sheep in the same countries and also hydrophobia between 1721–’24.

1723-'24. Silesia, Poland and Prussia again suffered great mortality among domestic animals.

The following epidemics are also reported:

1726. Anthrax in Poland, Silesia and Saxony, among sheep in Eichsfeld and Thuringia.

1731. Epizootic angina (the strangles) among horses in England. In the months of November, December, January and February, 1832-'3, epizootic of influenza broke out among the horses of England, which was described by Gibson. Also in 1734 an epidemic, described by Bartlet and Gibson, was observed and named by Heisinger an exanthematic fever.

1731-'32. The flying cancer of the tongue in France, Germany and Italy. In the spring of 1731 this disease was noticed in the Dauphine, Auvergne and the Borbonais, spreading afterwards over all France and the Rhine, and being observed soon after (1732) in Frankfort and Nassau, from where it again spread to France. Through the Palatinate, Witemburg and Baden it reached Switzerland and Savoy, and from the latter Italy. Scheuchzer gives us a detailed description of the disease in his before-mentioned work, the quoting of which would occupy too much time.

1740. The pox raged among the sheep in the neighborhood of Beauvais and again in 1754, 1761, 1762. Barbaret has left us excellent descriptions of the same.

1755. A disease of the mouth and claws broke out in Franconia as related by the following description: The first external sign of a diseased cattle was a lameness either in the front or hind foot. On making an examination of the foot it was found that the claws were festered, sore, heated and swollen. The mouth presented the same appearance. Both sides were a whitish-yellow, swollen, puffed up and full of sores, while a swollen blister covered the tongue. An internal heat was also noticed and an uncontrollable desire to drink, accompanied by foaming at the mouth. The lameness and other symptoms disappeared when the burning yellow water had passed away and the diseased skin had peeled off. Where the disease had developed, more swellings appeared on the teats of the diseased cows, which lasted longer than

those on the head and feet. There were no deaths reported from this disease, which attacked also horses, swine and sheep.

1756-'59. Pox broke out among sheep in Saxony, frequently causing loss of eyes or lips.

1757. An epidemic raged among the horses in Esthland, Livland and Finnland, through which, in the Dorpatian district, 1,500 horses died in seven weeks only; cattle also caught it. It seems to have been the "Siberian Plague" (anthrax.)

1761. An epidemic of anthrax (described by Reginer and called "Lovwet or Lobet" broke out in several cantons of Switzerland, causing great loss among the cattle and horses; it crossed over into Austria and France, as did pox among sheep.

In this year an epidemic arose among dogs which had never before been observed, as the physicians were not acquainted with it. In 1761 it appeared in Spain, where it continued till 1763. In the latter year it appeared in England and from there carried to the Bolonais.

Toward the end of this year it attacked the royal stud in Versailles and spread over the whole of France, raging till 1765.

In 1764 it extended into Bohemia and Franconia, and later into Italy. The dogs coughed, were tortured by intense heat, and swallowed with difficulty. In two days a pussy mass flowed from the mouth and nose; on the sixth day of the sickness very many died. The disease seems to have been "angina." The French descriptions of this disease are much better and more complete than the German. (Desmar; *Journal prac. de med. veter* IV. p 610.)

1762. A very fatal epidemic arose among horses in Denmark and Sweden, which Heisinger thought influenza. The sheep-pox also arose in several parts of France, and anthrax in Switzerland, Lorraine, in the Valle Cominice, in Italy and Austria.

I find the following statement:

From the middle of the seventeenth century to the be-

ginning of the eighteenth century, the losses in Europe between 1740 and 1750 to be 3,000,000 of cattle. In Denmark alone between 1745 and 1752, over 2,000,000 died. Up to the eighteenth century Germany lost 30,000,000 cattle. The loss of all Europe was 200,000,000. The immense losses sustained at that period were the cause of founding veterinary colleges. Lutz reports that in 1783 there were not less than 1,000 works on this disease.

Athanasius Kirchner describes a disease among oxen in 1617. The same disease attacked man, and 60,000 people died of the disease.

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## REPORTS OF CASES.

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### A SINGULAR CASE—WHAT WAS IT?

BY DR. G. A. LATHROP, D.V.S.

The subject was one of those delicate breed of dogs known as Italian greyhounds. When first seen he was lying upon his mistress's pillow, his head, one forward leg and one hind leg being moved spasmodically continually. I, of course, expected to receive a previous history of distemper, but upon asking for it, was surprised to be told that the dog previous to this had enjoyed perfect health. I then tried to obtain what history I could get, but with unsatisfactory results. All she knew about him was that the day before I was called he appeared lame in his right forward leg, and that now he was able to walk with the greatest difficulty, in fact, only crawled along. Upon examining him carefully I found that only the muscles of the right side were affected, the muscles of the left side being in a perfectly normal condition. The pectoral muscles of the right side were contracted to such an extent as to draw the right forward leg across the left forward leg, and he had no power to place it in a natural position, and if placed so it would be immediately drawn back again and all the time, together with all the muscles of the right side, were kept in a constant motion. Appetite was good and noticed things around him but seemed to have lost all power of co-

ordination with the right side. When placed in a standing position he would stand upon three legs, but the moment he would try to walk would fall down and could not rise without assistance. What I had to deal with I did not know, gave no diagnosis but gave a very doubtful prognosis, and treated symptoms accordingly. I placed him under bromide of potassium gr. ii, doses every two hours until relieved, or until seen again. The next day I found him somewhat improved, the twitching now being confined to the forward leg and neck, he having taken gr. xxiv of the bromide. Lengthening the time of administration to every four hours, I left to see him next day.

The next day he was worse, being the same as when first seen, and I was told that his bowels had not moved since he was affected, but urination was performed naturally. I had suspicion of paralysis of the bowels, and upon examining rectum found it full of fæces. I removed what I could with my finger and while doing so he had no tenesmus whatever. He did not seem to notice me. The sphincter ani would contract upon my finger, but the rectum felt flabby. After removing what fæces I could, I gave an enæma of warm water and soap, which was retained, left direction to give another enæma in about two hours if he did not have a passage, and also placed him under bromide, same dose every two hours.

I called next day to find that my little patient had died during the night, and that the owner said he seemed as if he was paralyzed all over just before he died.

Post-mortem revealed nothing as I could discover.

I send you a report of this case in hopes that some of my colleagues who have had more experience in canine pathology may know what it was I had to deal with. As far as I am concerned I must confess my ignorance. I could find nothing in my works, nor in a physician's library which described anything like it.

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#### A TUMOR OF THE SPLEEN.

BY A. E. DERWENT, D.V.S., Waverly, Iowa.

On November 1st I was called to see a stallion belonging to Edward Knott & Co, importers, at Waverly, Iowa. He

commenced to lose flesh suddenly and would eat only about half a feed; appeared dull without any fever; had a slight dropsical swelling under the chest. I prescribed iron internally, alternating with vegetable tonics. He continued to lose flesh and showed signs of ascites. The mucous membranes were very pale. He almost entirely lost his appetite in about six weeks from the time first noticed. After this time, feeling that there was water in the abdominal cavity, paracentesis abdominis was performed and about two gallons of reddish serum was taken away. It appeared rather bloody looking. About a week after this the stallion died, and at post mortem a large tumor was discovered connected with and firmly adhered to the spleen. (It was a fatty tumor or lipoma.) It weighed soon after taking out 38 pounds. Has anyone ever seen one as large as this taken from the spleen or any internal organ of this species?

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#### FRACTURE AND DISLOCATION AT THE ATLOIDO-OCCIPITAL JOINT.

By F. ALLEN, D.V.S.

I had a rather curious case yesterday which I think must be uncommon. Three days ago a gentleman came into the office and said he had a small dog which in jumping out of the buggy had been struck by the wheel and hurt. He had been unconscious for several hours and could not stand; I asked him to bring the dog round, but he did not do so till yesterday, seventy-two hours since the accident.

The dog, a black and tan terrier, three pounds weight, seemed bright and conscious; could drink milk when put before him and could move all his limbs, but was unable to stand. His head was drawn round towards his right shoulder and on the left side of his neck the wing of the atlas projected considerably, and on moving the head from side to side considerable crepitation could be heard.

I destroyed the dog by the owner's request, and on post-mortem found the following lesions: there was a dislocation of the occipito-atloid articulation, rupture of its ligaments and

the right condyle of the occipital bone was fractured. I think the dog could have lived, as seventy-two hours after the accident he was apparently in good health.

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#### OUTBREAK OF SPINAL MENINGITIS.

BY A. W. AXFORD, V.S.

I was called on Tuesday afternoon, Jan. 7th, to the farm of Edward Emmons, near Pottersville, Hunterdon County, N. J., the owner having requested me to come out there to see his horses, a singular and thus far fatal disease having broken out among his farm horses. The history of the cases described by him are as follows:

On New Year's day he drove two of them to Morristown and back, about twenty miles each way. Got home quite late; horses were very warm and sweaty when put in stable; waited until they were quite cool, then gave them their regular allowance of food and water. Food, four quarts oats (as sample) with hay, timothy and red top (as samples sent). About midnight he heard noise in stable, and on going there found one of them down and struggling hard with forward feet, with sweat pouring off in streams. He called a local horse doctor, who said the trouble was colic, the result of an overdrive, and treated for same; before morning the horse died.

Their attention was then called to the mate. A trembling was noticed in the hind limbs, and stiffness of the jaws; in less than one hour he fell down, and struggled violently with his forward legs, going round in a circle until death ended his sufferings two days after.

Before the second horse died the owner noticed an aged filly in the same stable seemed to have difficulty in chewing her food; would take in a mouthful of hay, chew it very slowly, then quid it out in a ball. The doctor said it was a good thing he had noticed it so early, as there would be no difficulty in keeping her on her feet by giving proper treatment. But soon after she began sinking down on her hind limbs, great trembling of limbs, and at last went down alto-

gether. This mare I saw three days after, or just before she died. (Two others in the same stable having begun quidding their food occasioned my being called.) I had no chance of conversing with the horse doctor, as he cleared out, bag and baggage, when I arrived on the ground.

I made an examination of the aged filly, and found hurried respiration, pulse 70, temperature  $108^{\circ}$ ; ordered her destroyed, which was neglected three hours, when she died; there did not seem to be any stiffness of the jaws.

The examination of seven-year brown horse proved as follows: respiration about normal, pulse 38, temperature  $104\ 7-8^{\circ}$ ; deathly coldness of hind limbs, with trembling of some.

Examination of the other horse found pulse 38, respiration about normal, also temperature about  $100^{\circ}$ , with no stiffness of the jaws in either case, but quite some paralysis of the tongue; seemed to chew very slowly, but did not have the power to work the food back to swallow it; bowels of each very much constipated.

After taking all the facts into consideration, I made no hesitancy in diagnosing all the cases as "spinal meningitis," and at once began treatment for same, and ordered entire change of food and drink for every animal on the farm; there were some seven or eight on the place that were not affected; changed all well animals to other quarters, disinfected all the stables with thymo cresol, and gave all a cathartic of burnt aloes, 8 drachms.

I visited the place again yesterday; had more time to examine the food fed formerly. The oats were gathered during the heavy rains of last July, and is the worst lot I ever saw, and is not fit to feed to sparrows; the hay is very bright; I picked up some samples from the hay loft; part of each I send you.

The stock was watered from a well near the barn; water is very hard; the soil is what is known as red shell; the well is driven through rock of this kind; the water we are now using is from the cistern at the house. The horses are improving under treatment, and no new cases are developing.

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Will you be kind enough to advise me by letter, after carefully examining the food sent, if you think the grain that was fed for weeks previous to sickness was cause enough for this disorder. Please send bill for services, and I will cheerfully remit you. An opinion from one standing as high as you will give general satisfaction to stock men in that vicinity.

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#### VENTRAL HERNIA.

By G. HESS, M.D., D.V.S.

On October 9th I was called to treat a colt about five months old that had, the night previous, received an injury in the right hypochondriac. The wound was produced by the horn of a cow, and extended through the abdominal walls into the cavity, from which protruded a fold of peritoneum more than two feet in length. From the strangulated condition of the protruding mass we decided to excise it, and did so after applying a carbolized gut ligature close to the abdominal parietes.

After cleansing the proximal end we returned it into the abdominal cavity and sewed up the wound in the skin and subjacent muscles with gut sutures. The wound healed rapidly and the animal never refused a single feed nor in any way seemed to suffer, except a slight soreness, from the loss of so great a portion of peritoneum, which when extended was fully eight square feet in extent.

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#### OBITUARY.

DR. JEAN MATHIAS WEHENKEL.

We have received the sad news of the death of Dr. Wehenkel, Director of the Veterinary School of Brussels, which took place on the 17th of January, at the age of fifty years. As a Doctor of Medicine he was held in high esteem, and his name was familiar to all interested in medical and veterinary literature, to both of which he was a liberal contributor. A member of numerous scientific societies, he wore the decorations of several orders, and was an Honorary Fellow of the

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Royal College of Veterinary Surgeons. He edited the *Annales de Bruxelles*, published a work on the Elements of Anatomy and Physiology, translated Roll's Practice into French, and wrote a variety of pamphlets on subjects relating to the diseases of domestic animals.

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## CORRESPONDENCE.

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### GRADUATES AND NON-GRADUATES.

DEAR SIR,—Inclosed I hand you three dollars for the REVIEW for 1890. I am much pleased with the magazine. I have been practising veterinary surgery for over thirty years. I traveled over these prairies when they were thinly settled in company with an itinerant Methodist preacher, he in search of the lost sheep of Israel, and I in hunt of fistulated horses. We both met with varied success. He was more lucky in finding, but I had more luck in redeeming those I did find.

It seems to me that some of your correspondents stand in terrible fear of non-graduates, and are urging stringent legislation to protect them in the practice of their profession. Does Mr. Bonner, when he drives Maud S. out, tremble with fear lest some drayman may whip up and pass him on the road? Does the man with real, solid attainment in any profession, and having within him a consciousness of ability and power, ask legislative protection from competition?

It might open the eyes of some of these weaklings who are begging to be protected from the rivalry of non-graduates if they were to visit the offices of some of them in this western country, and take a look through their libraries, where are to be found all the standard works of both Europe and America on veterinary science. But what would still more surprise them would be to see them daily effecting cures of diseases considered by the graduates as incurable, for instance, puerperal apoplexy and tetanus. If it would not be presuming too much I would here give their methods of treating—and curing—these diseases in nine out of ten

cases. In traumatic tetanus the day of heroic medication has passed with us. We aim to inform ourselves as to nature's methods and then as far as possible imitate them. In tetanus, by supporting the powers of nature, through mild and sanative processes, we carry the patient through to a safe termination of the disease.

I asked a non-graduate what veterinary works he regarded as the best. He replied that he read all, and what accorded with common sense in any of them he accepted.

Within the last two years there dropped suddenly into our midst a European graduate, with three diplomas, a silk hat and a pocket full of cigarettes. He was free in his denunciation of this "blarsted" country, and recommended all non-graduates to "go west" as he was about to "occupy the land." He began his display of knowledge and skill by tackling an old and confirmed ringbone that even a quack would know was incurable. He gave it fits in the way of burning. The leg swelled to the body and on the eighth day the horse died of lockjaw. In another case he opened the bursal sac to reduce the enlargement of a thorough-pin. Death ensued. His glib tongue failed to satisfy the owners that he had not been guilty of malpractice; and he departed leaving behind him a remembrance in the shape of an unpaid board bill. I have since learned that he is now occupying the honorable position, so well suited to his attainments, of janitor to a livery stable in a western city.

The stock men of the west are well versed in their business and not easily imposed upon. They can recognize a fraud even under a silk hat, and they can discern ability under a homespun jacket. Doubtless there are non-graduates practising veterinary with no mental equipments other than they were born with, and to whom nature exhibited no liberality in this regard; but they deceive very few. The man who understands his business, whether graduated from a veterinary college or from the school of experience, will, as we say out west, get there with both feet.

The knowledge needed cannot be acquired by a few years' study of books. This must be supplemented by practice;

and the man who takes practice in one hand and the books in the other, though he may never have seen a college building, will be the successful man in any profession. The successful practitioner must be a man of tact as well as of technical knowledge. He must be able to get away from the books, reason from cause to effect, and form an independent judgment. We have non-graduate veterinarians out here who are in the front rank. We have also graduates who do honor to the profession. Our State Veterinarian, Dr. Caswell, is a fair sample of the latter. He is not afraid that some ragged non-graduate will push him to the rear.

We have, I believe, here in the west, all the diseases incident to this continent, besides the dreaded French contribution *maladie du coit*, but happily this latter is rarely met with. And our practitioners must be prepared to combat them when they meet them.

I notice that many new remedies are on the market. I have not had occasion to try them, but hope they may prove to be all that is claimed for them.

Considerable interest is manifested here by our farmers in your publication, as shown by the many applications made to me for the loan of it. I shall try and get you a club, as I am satisfied the more the farmer reads the better will be our business. As he becomes better informed as to the mysterious symptoms and characteristics of various diseases, the more respect he has for the man who has made them a study and has acquired the ability to diagnose and prescribe for them; and the less disposition to risk the loss of his stock by attempting to do the doctoring himself.

A man should, in any avocation in life, be measured not by purchased diplomas or certificates, but by the actual ability he possesses, as demonstrated by his work. So let the graduate and non-graduate have a free and fair field with no protection or favor to either; or as we sometimes say out here: let the longest pole knock the persimmons.

Respectfully yours,

V. G. HUNT,  
Arcola, Ill.

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SOCIETY MEETINGS.

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LONG ISLAND VETERINARY SOCIETY.

A regular meeting of the Long Island Veterinary Society was held on the above date. The President, Dr. Geo. H. Berns, in the chair.

The following members were present :

Drs. Berns, R. A. McLean, Pendry, Houseman, Bowers, Bell, Decker Atchison, Jamison, Breslin, Newman, Buckley.

The minutes of the previous meeting were read and approved with one exception.

The Board of Censors and the Committee on Army Legislation reported progress.

Dr. R. A. McLean, the essayist for the evening, read an able and interesting paper, the subject being "Influenza."

All the members present participated in the discussion. The hour growing late, it was decided to postpone the discussion until the next meeting.

On motion, the essayist was unanimously extended a vote of thanks for his paper.

Dr. Geo. F. Bowers was appointed essayist for the March meeting.

Dr. R. A. McLean gave notice of alterations of Sections I. and II. of the Constitution at next meeting. The meeting then adjourned.

D. S. BRESLIN, D.V.S., *Secretary*.

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INDIANA ASSOCIATION OF VETERINARY GRADUATES.

The annual meeting of the Indiana Association of Veterinary Graduates was held in the Agricultural Room at the State House, Indianapolis, on the evening of September, 1889. The President, Dr. H. R. Macaulay, in the chair.

The following members responded to roll-call: Drs. Curphey, Rodger, Orlopp, Galbraith, Macaulay, Knowles, Thompson, Navin, Ferling, Ward, Inylne, Buckner, Reid, Digg and Shoemaker.

After the usual preliminary business had been despatched the election of officers for the ensuing year took place. The list is as follows:

President, Dr. M. E. Knowles, of Terre Haute; 1st Vice-President, Dr. J. M. Curphey, of Noblesville; 2d Vice-President, Dr. C. F. Bell, of Kokomo; 3d Vice-President, Dr. W. B. Wallace, of Marion; Secretary, Dr. H. R. Macaulay, of Indianapolis; Treasurer, Dr. J. H. Rodger, of Anderson; Board of Trustees: Drs. Bolser, Ward, Galbraith, Ferling and Upshall.

Following the election came the reports of committees; and then Dr. Knowles addressed the meeting on the causes and treatment of Sterility. This subject was very ably handled, and made very comprehensive by the display of instruments used.

Dr. Curphey then read an interesting and carefully prepared paper on Canine Distemper, which called forth a lively discussion, after which the meeting adjourned for the evening.

The continued session was held on the morning of the 26th, with Dr. Knowles, President, in the chair.

During this part of the meeting there were animated discussions on cases presented by the following members on the following subjects :

Dr. Digg reported a case of Tetanus and one of Paralysis.

Dr. Thompson reported a case of Traumatic Tetanus.

Dr. Shoemaker reported a case of Locomotor Ataxia.

Dr. Macaulay reported a case of Phenitis.

Dr. Inlyne reported a case of Poll Evil.

Dr. Rodger reported a peculiar case of Eczema.

The meeting then adjourned.

H. R. MACAULAY, *Sec'y.*

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#### ILLINOIS STATE VETERINARY MEDICAL ASSOCIATION.

The seventh semi-annual meeting took place at Peoria, on February 20th.

The following papers were to be presented, and we hope will be sent to the REVIEW for publication :

Coal Oil Poisoning in the Horse, by Dr. S. Kingery ; Anæsthetics in Veterinary Practice, by Dr. T. F. Reid ; Sterility in the Mare, by Dr. M. E. Knowles ; Quackery in the Veterinary Profession, by Dr. L. C. Tiffany ; The Action and Uses of Stimulants, by Dr. B. B. Page.

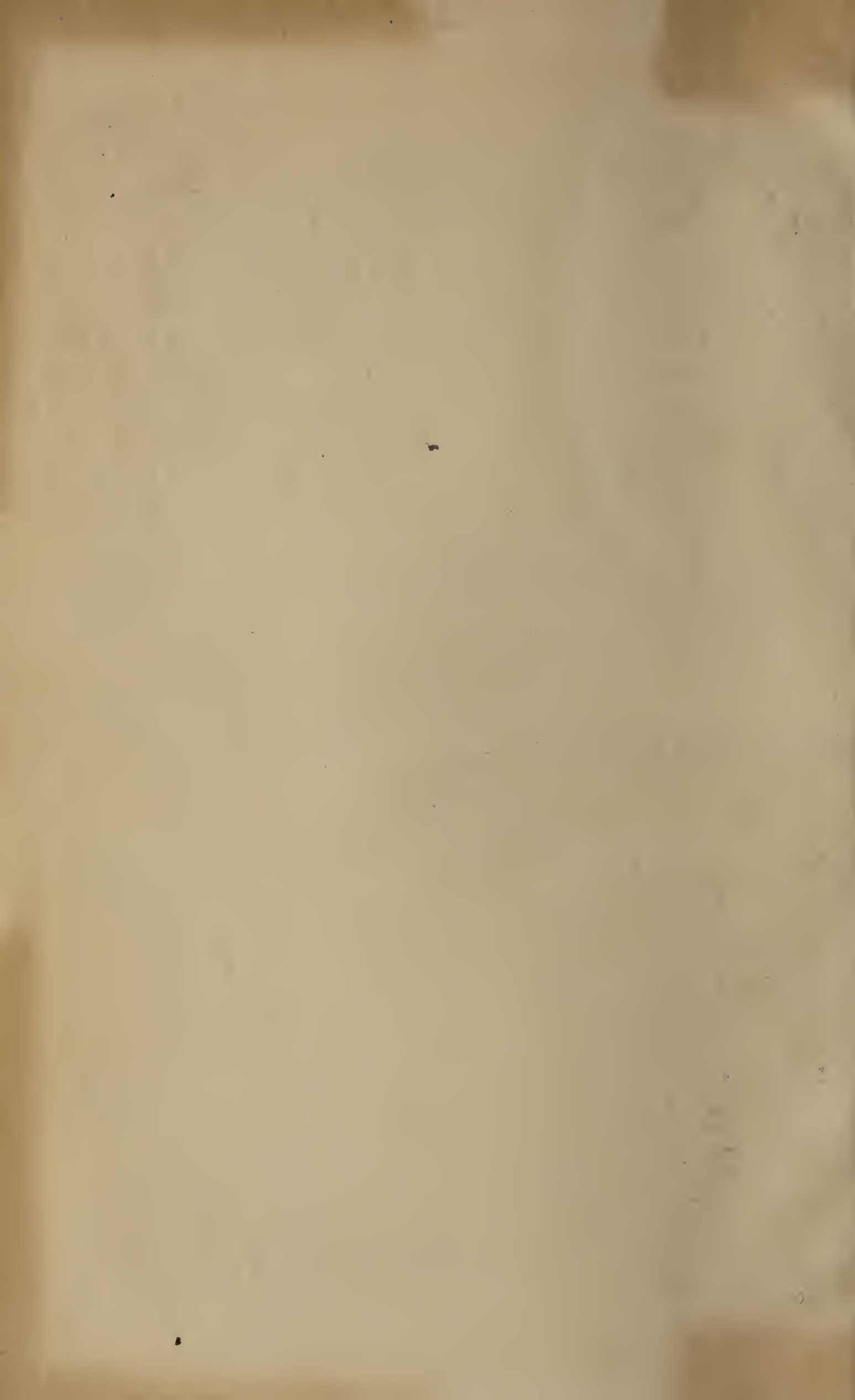
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SHOCKING DEATH OF A VIENNA PHYSICIAN.—Quite a gloom has been cast over Vienna medical circles by the death of a young pathologist in the General Hospital here. Two months ago a patient died in the hospital of glanders caught from a horse, and Drs. Rowalski and Hoffmann subjected the body to experimental observations. The bacillus of glanders was readily discovered, reared, and its behavior closely watched. The animals injected with it died of the horrible malady. During these observations Dr. Hoffmann caught cold, and felt acute pains in his side, to allay which he injected morphia. He did this with the syringe he had used during the glanders experiments. Although it had been disinfected, some particle of the poison must have still been in it, for Dr. Hoffmann grew worse every day, and last week he succumbed in horrible agony, his body being covered with ulcers, which when examined, proved to be filled with the glanders poison.—*Medical Press.*















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